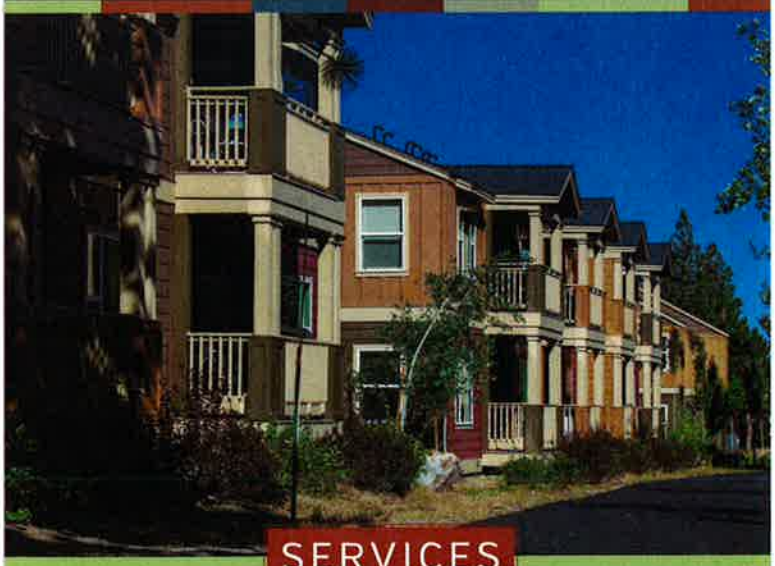
December 3, 2013
Regular Meeting
Board Report
Supervisor Johnston

Info. about
Mammoth Lakes
Housing

MAMMOTH LAKES HOUSING, INC.

OUR MISSION

To support workforce housing for a viable economy and a sustainable community.



SERVICES

- 85 low- and very-low-income rental units in Mammoth Lakes
- Certified Homeownership Counseling Workshops
- First-Time Homebuyer down payment assistance
- Deed restricted ownership opportunities

"I had lost all hopes of buying a home or condo in this town."

– Mammoth Lakes resident and owner of a deed restricted condo

587 OLD MAMMOTH RD. SUITE #4
P/760.934.4740 F/760.934.4724
INFO@MAMMOTHLAKESHOUSING.ORG
WWW.MAMMOTHLAKESHOUSING.ORG
@MLHOUSING

Board Reports
Johnston

THE FACTS

* The term "affordable" means spending about 30% of your income on housing. Families who spend more than 30% are considered cost-burdened and may have difficulty paying for food, clothing, medical care, or other necessities.

* Sufficient, decent, affordable housing is a critical component of our community's economic success.

* 52% of all homes in Mammoth Lakes are secondary, vacation homes. A limited supply of year-round options puts a strain on market rents and sales prices, driving them out of affordable ranges for the local workforce.

* Local employers experience less employee turnover, tardiness, and absenteeism when their employees are able to find local, affordable housing.

* In Mono County, an individual must make $23.13 an hour in order to afford a market-rate two-bedroom rental. It takes a household of 3 full-time minimum wage earners working 40 hours each week, 52 weeks each year, to afford a rental of this size.

* Living in an affordable home allows community members to spend money on other basic goods and services which stimulates our local economy.

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December 3, 2013
Regular Meeting
Item #9c
Community Development

Update on County RTIP Submittal

Draft - MONO 2014 RTIP

MCLTC program priorities for 2014	Agency	Rte	PPNO	Project	Total	Prior	FY Totals 14-15	15-16	16-17	17-18	18-19	Component Totals ROW	Const	PA & ED	PS & E	R/W sup	Con sup
	PROPOSED 2014 RTIP PROGRAMMING																
	Caltrans	14	8042A	Kern, 4-lane, Freeman Gulch (RIP 10%), segment 1	4,489	250	1,130	0	3,109	0	0	950	2799	0	250	180	310
	Caltrans	14	8042B	Kern, 4-lane, Freeman Gulch (RIP 30%), segment 2	3,258	0	0	975	2,283	0	0	1653	0	0	975	630	0
	Caltrans	395	170	Olancha-Cartago 4-lane expressway (RIP 10%)	11,018	513	1,655	0	0	8,850	0	1352	8040	0	513	303	810
	Caltrans	395	8539	Kern, Inyokern 4-lane (RIP 10%)	310	310	0	0	0	0	0	0	0	310	0	0	0
	Caltrans	395	260B	SBd, Rt 15-Farmington, widen (RIP)	2,000	2,000	0	0	0	0	0	0	0	2000	0	0	0
	Mammoth Lakes	loc	2546	Canyon Blvd, Forest Trail-Hillside Dr rehab	3,685	3,685	0	0	0	0	0						
	Mammoth Lakes	loc	2595	Meridian Roundabout & signal relocation to Sierra Park	2,645	35	0	2,610	0	0	0						
New	**Mammoth Lakes**	**203**		**West Minaret Road (SR 203) Sidewalk & Safety Project**	700	0	**25**	**165**	**0**	**510**	0	**115**	**585**	**25**	**50**	**10**	
New	**Mammoth Lakes**	**203**		**North Main St. (SR 203) North main St. Sidewalk and Safety Impr Project Phase 2a**	1,170	**0**	**30**	**90**	**1,050**				**1050**	**30**	**90**		
	Mono County	loc	2561	June Lake streets rehab	3,657	3,657	0	0	0	0	0	0	0	0	242	0	0
	Mono County	loc	2563	Chalfant streets rehab	1,419	1,419	0	0	0	0	0	0	1,419	0	0	0	0
New	**Mono County**			**Airport Road Rehabilitation Project**	1,273	**0**		**31**	**52**	**1,190**			**1,190**	**31**	**52**		
New	**Mono County**			**Convict Lake Road FLAP Match**	653		**69**	**584**					**584**		**69**		
New	**Mono County**			**County-wide Preventative Maintenance Program**	1,150	**0**	**50**	**100**	**1,000**				**1,000**	**50**	**100**		
	Mono LTC		2003	Planning, programming, and monitoring	435	0	130	130	**175**	0	0						
New	**Mono LTC**		**2003**	**PPM**	360					**180**	**180**		**360**				
	Rail and Transit Project Proposals:																
	Mono LTC	bus	2566	Replacement buses, Eastern Sierra Transit Authority (ESTA)	180	90	90	0	0	0	0		180				
				assumes these buses are federalized													
New				**Bus replacement for ESTA**	400			**200**	**200**	**0**			**400**				
	Mammoth Lakes	te	2597	Mammoth Creek gap closure (TE $1.916k)	69	69						204	1514	69	129	0	0
	Mammoth Lakes	te	2597	Mammoth Creek gap closure (TE $1.916k)	-1,847	0	-333		-1514			-204	-1514	69	-129	0	0

				Balance of STIP Shares	8439
				New programming or STIP shares for 2014 (6331k includes lapses of 165k)	6331
				old TE reserve 954k & 1847k for TE ppno 2597	2801
				subtotal	**17571**
New $	Caltrans	395	170	Olancha-Cartago 4-lane expressway (RIP 10%)	8850
	Mono LTC			New Local Projects	4946
	Mono LTC			Replacement buses for ESTA	400
	Mono LTC			Planning, Programming & Monitoring	360
				subtotal	**14556**
	Mono LTC			**Reserve for future MOU project needs**	**3015**

9c

December 3, 2013
Regular Meeting
Item #13a
Community Development

U.S. Fish & Wildlife Service Sage-Grouse Listing Workshop

U.S. Fish & Wildlife Service

News Release

Nevada Fish and Wildlife Office
1340 Financial Way, Suite 234
Reno, Nevada 89502
Tel: 775-861-6300; Fax 775-813-4546
http:/fws.gov/nevada

Date: October 25, 2013
Contact: Jeannie Stafford (775) 861-6300
Jeannie_Stafford@fws.gov

FOR IMMEDIATE RELEASE

Bi-State Distinct Population Segment of Greater Sage-Grouse Proposed for Protection under Endangered Species Act

Special rule would allow flexibility for beneficial land management practices

RENO, Nev. – The U.S. Fish and Wildlife Service today proposed to protect the Bi-State Distinct Population Segment (DPS) of greater sage-grouse along the California-Nevada border as a threatened species under the Endangered Species Act (ESA). The proposal includes a special rule that would provide increased flexibility for land management practices that are intended to benefit the sage-grouse.

"We applaud the combined efforts of our federal, state and local partners, as well as private landowners across the species' range, to address the significant challenges faced by the Bi-State DPS of greater sage-grouse," said Ren Lohoefener, Regional Director of the Service's Pacific Southwest Region. "These efforts are essential to the recovery of the species. Today's proposal, based on the best available science, should not deter us from continuing our work on behalf of the Bi-State DPS and its important sage brush habitat."

The DPS's current range is limited to six population management units (PMUs) along the California and Nevada border, which is less than 50 percent of its historical range. Scientists predict that four of the six PMUs could be lost in the foreseeable future.

Today's Bi-State DPS proposal is being considered separately from the petition for protection of the greater sage-grouse and will have no bearing on the future evaluation of the wider-ranging populations of greater sage-grouse. The sage-grouse is a large, ground-nesting bird known for elaborate courtship displays on its breeding grounds.

The special rule proposed for the Bi-State would allow increased flexibility in implementing actions that will help conserve sage grouse. For example, the Service will consider whether to exempt from ESA take prohibitions land management practices consistent with the Bi-State Sage Grouse Local Area Working Group Action Plan, which was finalized in 2012, thus removing the need for any additional regulatory review.

Signatories to this plan include the Bureau of Land Management, U.S. Forest Service, Natural Resource Conservation Service, U.S. Geological Survey, Nevada Department of Wildlife, California Department of Fish and Wildlife, and the Service.

While the 2012 Action Plan is non-regulatory, it provides a general strategic path toward conservation, provides stakeholders a degree of confidence in implementation, and will serve as a good framework for development of a species recovery plan.

The Service also is proposing to designate approximately 1.86 million acres of critical habitat for the DPS. This habitat encompasses federal, state, tribal and private lands on four separate units in Carson City, Douglas, Lyon, Mineral and Esmeralda Counties in Nevada, and in Alpine, Mono, and Inyo Counties in California.

Critical habitat is a term defined in the ESA and identifies geographic areas containing features essential to the conservation of a threatened or endangered species and that may require special management considerations or protection. The designation of critical habitat does not affect land ownership or establish a refuge, and has no impact on private landowners taking actions on their land that do not require federal funding or permits.

The Service will open a 60-day comment period to provide the public an opportunity to comment on the proposed listing, special rule and designated critical habitat. During the public comment period, the agency will also seek peer review from qualified members of the scientific community to ensure that the final decision is based on the best available science. A copy of the finding and other information about the bi-state DPS of the greater sage-grouse is available at http://www.fws.gov/nevada or by contacting the Nevada Fish and Wildlife Office at 775-861-6300.

The Endangered Species Act provides a critical safety net for America's native fish, wildlife and plants. This landmark conservation law has prevented the extinction of hundreds of imperiled species across the nation and promoted the recovery of many others.

The agency will hold two informational public meetings regarding the proposals at the following times and locations:

November 5, 2013
4 to 6 p.m.
Tri-County Fairgrounds, Home Economics Building
Sierra Street and Fair Drive
Bishop, CA 93514

November 6, 2013
1 to 3 p.m.
Smith Valley Community Center
2783 State Route 208
Wellington, NV 89444

Scientific information regarding these proposals will be accepted until December 27, 2013, and may be submitted by one of the following methods:

(1) Electronically: Go to the Federal eRulemaking Portal:
http://www.regulations.gov. In the Search box, enter FWS–R8–ES–2013–0042 and FWS-R8-ES-2013-0072, which are the docket numbers for these rulemakings. Then, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on "Comment Now!"

(2) By hard copy: Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS–R8–ES–2013–0042 and FWS-R8-ES-2013-0072; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, MS 2042–PDM; Arlington, VA 22203.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. We are both a leader and trusted partner in fish and wildlife conservation, known for our scientific excellence, stewardship of lands and natural resources, dedicated professionals, and commitment to public service. For more information on our work and the people who make it happen, visit http://www.fws.gov/cno. Connect with our Facebook page, follow our tweets, watch our YouTube Channel, and download photos from our Flickr page.

-FWS-

Editors: photos to support this story are available on our Flickr page at http://www.flickr.com/photos/usfws_pacificsw.

U. S. Fish & Wildlife Service

Nevada Fish and Wildlife Office

Conserving the biological diversity of the Great Basin, eastern Sierra, and Mojave Desert

Proposed Listing, Special 4(d) Rule, and Critical Habitat Bi-State Distinct Population Segment of Greater Sage-Grouse

Frequently Asked Questions

What is the Bi-State Distinct Population Segment (DPS) of greater sage-grouse and where does it occur?
The Bi-State DPS of greater sage-grouse (*Centrocercus urophasianus*), which in the past has been referred to as the Mono Basin area population of greater sage-grouse, includes sage-grouse that occur in portions of Carson City, Lyon, Mineral, Esmeralda, and Douglas Counties in Nevada. It also includes sage-grouse in portions of Alpine, Inyo, and Mono Counties in California.

Why did the U. S. Fish and Wildlife Service determine that Bi-State greater sage-grouse population is a Distinct Population Segment (DPS)?
The Bi-State greater sage-grouse population qualifies as a DPS because genetic analysis shows it has been separated from other greater sage-grouse for thousands and perhaps tens of thousands of years and is discrete. It is significant to the remainder of the greater sage-grouse population because of these genetic differences.

The Service and the National Oceanic and Atmospheric Administration-National Marine Fisheries Service, developed the Policy Regarding the Recognition of Distinct Vertebrate Population Segments (DPS Policy) (61 FR 4722), to help determine what constitutes a DPS. The DPS Policy identifies three elements to be considered in a decision regarding the status of a possible DPS. These elements include (1) the discreteness of the population segment in relation to the remainder of the species to which it belongs; (2) the significance of the population segment to the species to which it belongs. If a population satisfies the above two elements, it is a DPS and then the third element is applied: (3) the population segment's conservation status in relation to the Endangered Species Act (ESA) standards for listing, delisting or reclassification (is the population segment threatened or endangered). Our policy further recognizes it may be appropriate to assign different classifications (i.e., threatened or endangered) to different DPSs of the same vertebrate taxon.

What is the Service's determination regarding the status of Bi-State DPS of the greater sage-grouse?
After evaluating the best available scientific information regarding the Bi-State DPS of greater sage-grouse, including an analysis of the threats to the species and its habitat, the Service has

determined that protection under the ESA is warranted, and the species is proposed for listing as threatened. If the Service finalizes the rule as proposed, it would extend the ESA's protections to this species.

What is the purpose of the special rule? What will it do?
The special rule will increase flexibility in implementing actions that will help conserve sage grouse. For example, any actions consistent with the Bi-State Sage Grouse Local Area Working Group Action Plan will be recognized as helping to conserve sage grouse, and will not require additional regulatory review to ensure they would not jeopardize the species.

The proposed 4(d) special rule provides that any take of the Bi-State DPS of greater sage-grouse incidental to agricultural activities that are included within a conservation plan developed by the NRCS for private agricultural lands and consistent with NRCS's Sage Grouse Initiative (SGI), as specified in this proposed rule, is not a prohibited action under the ESA.

What threat analysis did the Service complete in making this determination?
Under the ESA, the Service can determine that a species is an endangered or threatened species based on any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence.

We have determined that the primary threats to the Bi-State DPS of greater sage-grouse are urbanization and habitat conversion (Factor A); infrastructure (Factors A and E); mining (Factors A and E); renewable energy development and associated infrastructure (Factors A and E); non-native and native invasive species (e.g., cheatgrass, pinyon-juniper encroachment) (Factors A and E); wildfires and altered fire regime (Factors A and E), and small population size and population structure (Factor E). Other threats impacting the DPS are climate change, including drought (Factors A and E); recreation (Factors A and E); disease and predation (Factor B); and inadequacy of existing regulatory mechanisms (Factor D).

The DPS is experiencing multiple, interacting impacts (i.e., synergistic effects) to sage-grouse populations and sagebrush habitats that are ongoing (and expected to continue into the future) in many areas throughout the species' range.

Bi-State DPS of greater sage-grouse occur as small, local populations that are relatively isolated from each other. Small populations are inherently at greater risk than larger populations from events such as disease epidemics, or environmental catastrophes. Together, the Bodie and South Mono PMUs (which harbor the two stronghold populations), located mainly in California, represent less than 20 percent of the historical range for the Bi-State DPS.

Why did the Service make a determination on the Bi-State DPS of greater sage-grouse?
The Service received two petitions to list the Bi-State DPS of greater sage-grouse, one from the Institute for Wildlife Protection (dated December 28, 2001), and the other from the Stanford Law School Environmental Law Clinic (dated November 10, 2005) on behalf of the Sagebrush Sea Campaign, Western Watersheds Project, Center for Biological Diversity, and Christians Caring

for Creation. A series of actions by the Service was taken in response to the petitions, which included publication (in 2006) of a 90-day finding that these petitions did not present substantial scientific or commercial information indicating that the petitioned actions were warranted.

There also have been legal challenges, and the Service voluntarily remanded its 2006 90-day finding. Based on reevaluation, the Service published a 90-day finding on April 29, 2008, concluding the petitions presented substantial scientific or commercial information indicating that listing this population may be warranted, initiated an in-depth status review, and made a warranted but precluded 12-month finding, placing the species on the candidate list.

What is being done to conserve the Bi-State DPS of greater sage-grouse?The Service acknowledges its state, federal and local working group partners as well as private landowners for their ongoing and proposed conservation efforts across the range of the Bi-State DPS of greater sage-grouse. A Bi-State Local Area Working Group has been meeting regularly to discuss projects, issues, and opportunities, and developed a Local Area Working Group Action Plan in 2004. In 2012, the Bi-State Action Plan was finalized. Similar in nature to the 2004 Plan, it updated the current understanding of the population and apparent stressors and includes a series of actions needed to alleviate impacts. Signatories to this plan include the Bureau of Land Management, U.S. Forest Service, Natural Resource Conservation Service, U.S. Geological Survey and the Service, and the plan was vetted through participants associated with the 2004 Plan.

While the 2012 Action Plan remains non-regulatory, it provides a general strategic path forward toward conservation and affords a degree of confidence in implementation among stakeholders. It will also serve as a good framework for development of a species recovery plan.

Does the proposed listing of the Bi-State DPS of greater sage-grouse mean that the wider ranging greater sage-grouse will also be proposed for listing?
No. The Service's decision on the Bi-State DPS of greater sage-grouse is based on the best available science and is unique to this DPS. It was considered for protection as a separate entity and will have no bearing on the future evaluation of the wider-ranging population of greater sage-grouse.

There is still time to make conservation progress prior to the 2015 settlement date for the wider-ranging greater sage-grouse. Our proposed listing of the Bi-State DPS of greater sage-grouse should not deter implementation of actions for either the Bi-State DPS of greater sage-grouse or the wider-ranging greater sage-grouse.

What activities could be affected by the proposed listing and proposed critical habitat?
If a species is proposed for listing, under Section 7(a)(4) of the ESA, federal agencies are required to confer with the Service on any actions that are likely to jeopardize the continued existence of Bi-State greater sage-grouse or destroy or adversely modify proposed critical habitat. Also, if there is a project with a federal nexus (authorized, funded, or carried out by a federal agency) on non-federal lands, conferencing with the Service may be required. Federal agencies may also request conferencing with the Service on any program or activity that may affect a proposed species or proposed critical habitat.

What is the Service's determination regarding critical habitat for the Bi-State DPS of greater sage-grouse?

As part of the listing proposal, the Service has identified 1,868,017 acres of proposed critical habitat. This habitat is encompassed within federal, state, tribal, and private lands on four separate units in in Carson City, Douglas, Lyon, Mineral and Esmeralda Counties in Nevada, and in Alpine, Mono, and Inyo Counties in California. Consistent with the definition of "critical habitat," the four units are the specific areas within the geographical area occupied by the species at the time of listing on which are found those physical and biological features essential to the conservation of the species. Land ownership in the four units is: 86 percent federal; 1 percent state; 9 percent private; 2 percent tribal; and 2 percent local.

What is critical habitat?

"Critical habitat" is a term in the ESA that identifies geographic areas of particular importance to the conservation of a threatened or endangered species. The ESA defines "conservation" as the actions leading towards the eventual recovery of a species to the point where it is no longer threatened or endangered.

The ESA requires federal agencies to consult with the Service on any of their actions that may affect designated critical habitat. The Service can then recommend ways to minimize any adverse effects. It imposes no requirements on state or private actions on state or private lands where no federal funding, permits, or approvals are required.

Does a critical habitat designation mean an area is considered a wildlife refuge or sanctuary?

No. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve or other conservation area. It does not allow government or public access to private lands.

Will the Bi-State DPS of greater sage-grouse only be protected in places where critical habitat is designated?

No. All other protections afforded by the ESA apply both on and off designated critical habitat. Listed species, both inside and outside critical habitat, are protected from "take" (e.g., shooting, killing, trapping, and collecting). "Take" can be intentional or incidental. And "take" includes harming and harassing individual animals. However, take may be allowed with a permit from the Service.

How was critical habitat determined for the Bi-State DPS of greater sage-grouse?

The Service used the best available science and reviewed all available information pertaining to the habitat requirements of the species. In determining which lands to include in the critical habitat proposal, we identified the physical or biological features essential to the conservation of this species. First, we identified sagebrush plant communities that contain herbaceous vegetation consisting of a diversity and abundance of forbs, insects, and grasses that fulfill all of the seasonal dietary requirements of the Bi-State DPS of greater sage-grouse. Second, we identified non-sagebrush habitats located adjacent to sagebrush plant communities used by the Bi-State DPS of greater sage-grouse for foraging during seasonally dry periods. These habitats are

generally more mesic (containing moderate amounts of moisture) than surrounding habitat, and include wet meadows, riparian areas, and irrigated pastures.

Does everything within the critical habitat boundary get treated as critical habitat?
No. The Service cannot map critical habitat in sufficient detail to exclude all developed areas and other lands unlikely to contain "primary constituent elements" essential for sage-grouse conservation. Within the critical habitat boundaries, only lands containing some or all of the primary constituent elements are designated as critical habitat. Existing man-made features and structures within critical habitat, such as buildings; roads; residential landscaping; residential, commercial, and industrial developments; and other features, do not contain the primary constituent elements. Therefore, these areas are not critical habitat and are specifically excluded from the designation.

In addition, we are not including 13,397 acres of land within the proposed critical habitat designation because the Department of Defense, Hawthorne Army Depot, has a completed, Service-approved Integrated Natural Resources Management Plan (INRMP). An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found on the base. Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management; fish and wildlife habitat enhancement or modification; wetland protection, enhancement, and restoration where necessary to support fish and wildlife; and enforcement of applicable natural resource laws.

What are Primary Constituent Elements (PCEs)?
According to 50 CFR 424.12(b), the Service is required to identify the physical or biological features essential to the conservation of the Bi-State DPS of greater sage-grouse in areas occupied at the time of listing, focusing on the features' primary constituent elements. We consider primary constituent elements to be those specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species.

Based on our current knowledge of the physical or biological features and habitat characteristics required to sustain the species' life-history processes, the Service determined that the primary constituent elements specific to the Bi-State DPS of greater sage-grouse are:

PCE 1: Areas with vegetation composed primarily of sagebrush plant communities of sufficient size and configuration to encompass all seasonal habitats for a given population of greater sage-grouse, or facilitate movements within and among populations.

PCE 2: Breeding habitat composed of sagebrush plant communities with structural characteristics within the ranges described below. Habitat structure values are average values.

Vegetation Variable	Amount of Occurrence in the Habitat
Sagebrush Canopy Cover	>20 percent
Non-sagebrush Canopy Cover	>20 percent
Total Shrub Canopy Cover	>40 percent
Sagebrush Height	>30 cm (12 in)

Perennial Grass Cover	No less than 5 percent but >10 percent if total shrub cover <25 percent
Annual Grass Cover	<5 percent
Forb Cover	>10 percent
Grass/Forb Height	>18 cm (7 in)

PCE 3: Brood-rearing habitat composed of sagebrush plant communities and alternative, mesic habitats used primarily in the summer-late fall season. These sites include, but are not limited to: riparian communities, springs, seeps, mesic meadows, and irrigated hay pastures with structural characteristics within the ranges described below.

Vegetation Variable	Amount of Occurrence in the Habitat
Sagebrush Canopy Cover	10 - 25 percent
Total Shrub Canopy Cover	14 - 25 percent
Sagebrush Height	> 30 cm (12 in)
Perennial Grass Cover	> 7 percent
Perennial Forb Availability	> 5 species present
Forb Cover	> 7 percent
Grass/Forb Height	18 cm (7 in)
Meadow Edge (ratio perimeter to area)	> 0.015
Species Richness	> 5 species

PCE 4: Winter habitat composed of sagebrush plant communities with sagebrush canopy cover greater than 10 percent and sagebrush height of greater than 25 cm (9.8 in) above snow level.

Is an economic analysis being prepared for the proposed critical habitat designation?
Yes. The Service is preparing an analysis of the economic impacts of the proposed critical habitat designations and related factors and will announce the availability of the draft economic analysis as soon as it is completed. At that time, the Service will seek additional public review and comment.

How can I find out more information about the proposals?
Two public meetings have been scheduled at the following locations and times:

November 5, 2013
4 to 6 p.m.
Tri-County Fairgrounds, Home Economics Building
Sierra Street and Fair Drive
Bishop, CA 93514

November 6, 2013
1 to 3 p.m.
Smith Valley Community Center
2783 State Route 208
Wellington, NV 89444

Information about the proposals is available on the web at http://www.fws.gov/Nevada or at http://www.regulations.gov, or by calling the U.S. Fish and Wildlife at 775-861-6300.

How can I provide comments on the proposals?
Scientific information regarding these proposals will be accepted until December 27, 2013 and may be submitted by one of the following methods:

(1) Electronically: Go to the Federal eRulemaking Portal: http://www.regulations.gov. In the Search box, enter FWS–R8–ES–2013–0072 and FWS–R8–ES–2013–0042, which are the docket numbers for these rulemakings. Then, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on "Comment Now!"

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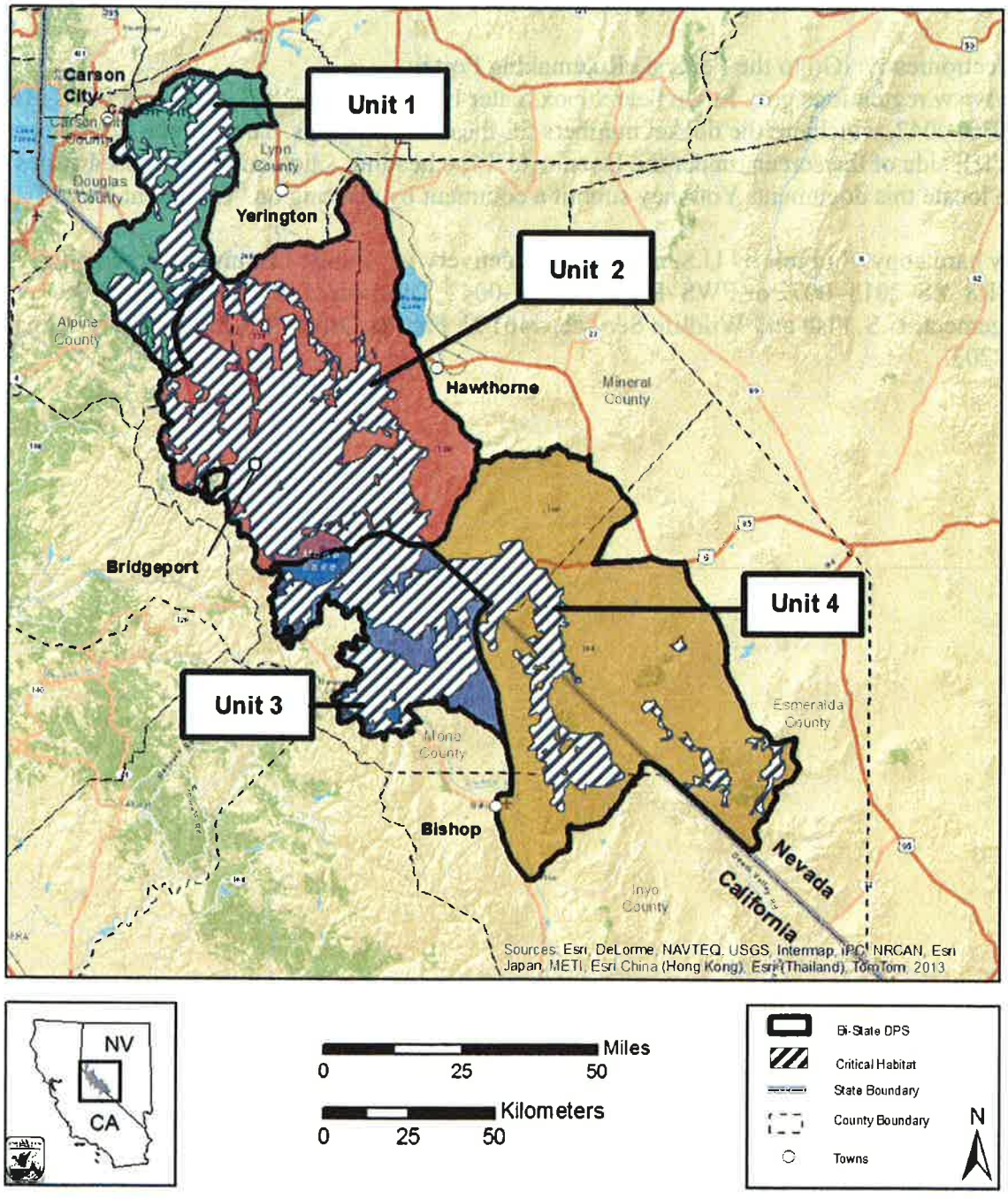
Index Map: Critical Habitat for Bi-State Distinct Population Segment (DPS) of Greater Sage-Grouse; Alpine, Inyo, and Mono Counties, California; and Carson City, Douglas, Esmeralda, Lyon, and Mineral Counties, Nevada



FRED FULSTONE, JR.
MARIANNE F. LEINASSAR
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fimcorporation@gmail.com

F.I.M., CORP.
Farming and Livestock

P.O. BOX 12
SMITH, NEVADA 89430

Fred Fulstone speech to Bi-State Sage Grouse Council
Bridgeport, California
December 3, 2013

The best management plan to sustain and improve sage grouse numbers and also save the farming communities is the following.

1. Don't list the sage grouse [DANGEROUS]
2. Protect the sage grouse from the hostile environment, mainly the animals and birds that destroy them. You don't have to necessarily destroy these predators. There are many ways to protect the sage hen.
3. There should be wildlife herders on the range all the time, night and day, to protect the wildlife and find out what is needed to protect them. New ideas. It can be done and you don't have to stop grazing of livestock, which has been in use for over 100 years and we still have wildlife.
4. Peter Coates is doing that very thing today to find out what animals, birds, and weather is destroying the sage hen. He has people on the range night and day. Read Peter Coates study on the Virginia Hills. He has found in this study that wildlife is destroying 82.5% of nests and non-fly days of the bird.
5. There can be structures and water facilities built on the range to protect the sage grouse. The sage grouse will work with us. They are tame birds.
6. Those billions of dollars used to stop grazing of livestock should be used to protect and sustain the grouse on the range.

The farmers and livestock people, trappers and miners, opened up the west by cultivating the land and putting water on it, and by creating habitat everywhere, which created wildlife everywhere .The hundreds of trappers took care of the predators which started the great wildlife communities in the early days. One small example of these accomplishments is the Walker

River Irrigation district. The farmers built two beautiful reservoirs. The Bridgeport reservoir and the Topaz reservoir, which are both considered two of the best fisheries and bird refuges in the west.

Today you see Harry Reid, Fish and Game, and radical environmentalist using OUR money, to buy up the land and water rights and taking the land out of production. Our government is making thousands of crazy regulations and forcing the farmers and livestock off the land. Just wait and you will see the whole scenario affect our food supplies someday .Then it will be too late. Just like Russia, when Stalin shot all the farmers, and their food supply has not recovered yet.

People you better wake up before our government destroys our civilization. Nikita Sergey Khruschev, Russia's Premier from 1958-1964, predicted this. Thru regulations, excuses, and the endangered species act , the government is forcing the FS and BLM to take livestock off the ranges. It's all based on false data, unsupported assumptions, and bad modeling.

The government has done nothing on invasive plants and trees through the years. The FS and BLM have put severe regulations on riparian areas and allowed willows, trees and other invasive species to dominate our rivers and streams. The willows and trees are taking over and cause water to back up and create more willows. This is also causing the quaking aspen to take over all the meadows. I think the PHD's are trying to create a rain forest or jungle, here, which will eventually deplete our water supply, water sheds, and no pasture for our livestock, also no food for our people. This is a revolting situation happening right before our eyes and the people are paying the environmental groups [Sierra Club, Biodiversity, Western Watershed], and many others to destroy our country.

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USFWS Meeting of 12-3-13
Bridgeport, California
Fred Fulstone presentation

The one thing I have noticed at all of the Sagebrush Ecosystem Council, BLM, FS, and Bi-State meetings, is there is practically nothing said about predation on sage hen or predation and prey. Understanding the real depredation on sage hen is the most important [No.1} issue that should be considered and studied, if you are going to increase the sage hen numbers. Today we have coyotes, badgers, ground squirrels, hawks, eagles and ravens that will eat sage hen . Except in the years from1950 to 1980 when we had an abundant use of trappers and a predation program that controlled the predators on the wildlife. Those years we had thousands of sage hen, deer, and other wildlife everywhere. Just look at NDOW's records. The U.S. Governments "Wildlife Service" in co-ordination with the State Government and sheep permittes, was the most important agency which controlled the predators [avian and ground], from 1950 to 1980, which in turn created thousands of wildlife during those years. The sheep producers were taxed then and are taxed now to help control the predators. At that time, I might mention, that there were many more livestock on the Federal ranges, and still ample habitat for the wildlife especially the sage hen. In 1972 government trappers were cut, and severe regulations were put on trapping. From 1980 up to now, sage hen numbers have leveled off. Government trappers just lately have been cut in half. This is counterproductive. Please look at the Federal Register paper included here number 51579. The following is what USFWS said about

predators in the year 2000. [Look at 51579 bottom right.] Most juvenile mortality occurs during nesting and the flightless chick stage, and is due primarily to predation, or severe weather conditions. Sage grouse typically live between 1 and 4 years and have an annual mortality rate of roughly 50 to 55%, with females generally having a higher survival rate than males. Up to 50% of all sage grouse mortality is caused by predation, from both avian [e.g. hawks, eagles, and ravens,] and ground [e.g., coyotes, badgers, and ground squirrels] predators. Improving all the meadows and habitat won't do any good because you won't have baby chicks to put there if you don't control predators, both avian and ground. I've noticed in the fish and game hatcheries that they have a wire netting cover over the bird hatchery until they can fly. They want to save the eggs and young birds from avian predators. On the open range predator removal is the most efficient management strategy to increase sage grouse numbers. Also, hunting permits should not be issued if the USFWS thinks they are at risk. Cal. And Nev. Fish and Game have continued to issue hunting permits even though they have said the birds[sage grouse] numbers were on the downward side.

Fred Fulstone

Fred Fulstone

and the finding is to be published promptly in the Federal Register. If we find that substantial information was presented, we are required to promptly commence a review of the status of the species involved, if one has not already been initiated under our internal candidate assessment process.

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We have made a 90-day finding on a petition to list the western sage grouse (*Centrocercus urophasianus phaios*) in Washington. The petition, dated May 14, 1999, was submitted by the Northwest Ecosystem Alliance and the Biodiversity Legal Foundation, and was received by us on May 28, 1999. The petition requested the listing of western sage grouse in Washington as threatened or endangered. The letter clearly identified itself as a petition and contained the names, signatures, and addresses of the petitioners. Accompanying the petition was supporting information relating to the taxonomy, ecology, and past and present distribution of the species, as well as the threats faced by the western sage grouse in Washington.

The petitioners requested listing for the Washington population of western sage grouse and not the species rangewide. We consider this request appropriate because, although we do not base listing decisions on political subdivisions except international boundaries, we can consider a population of a vertebrate species or subspecies as a listable entity under the Act if the population is recognized as a distinct population segment (DPS) (61 FR 4722). We can also expand the scope of our review of petitions to the species rangewide, should expansion be appropriate based on our knowledge of the available information.

The information regarding the description and natural history of sage grouse, below, has been condensed from the following sources: Aldrich 1963, Johnsgard 1973, Connelly *et al.* 1988, Fischer *et al.* 1993, Drut 1994, Washington Department of Fish and Wildlife (WDFW) 1995, Washington Sage and Columbian Sage Grouse Workshop (WSCSGW) 1996 and 1998, and Schroeder *et al.* 1999a.

Sage grouse, also known as sage fowl, spine-tailed grouse, fool hen, cock-of-the-plains, and sage chicken, are gallinaceous (chicken-like, ground-nesting) birds, and are the largest North American grouse species. Adult males range in size from 66 to 76 centimeters (cm) (26 to 30 inches (in)) and weigh between 2 and 3 kilograms (kg) (4 and 7 pounds (lb)); adult females range in size from 48 to 58 cm (19 to 23 in) and weigh between 1 and 2 kg (2 and 4 lb). Males and females have dark grayish-brown body plumage with many small gray and white speckles, fleshy yellow combs over the eyes, long pointed tails, and dark-green toes. Males also have blackish chin and throat feathers, conspicuous phylloplumes (specialized erectile feathers) at the back of the head and neck, and white feathers around the neck and upper belly forming a ruff. During breeding displays, males also exhibit olive-green apteria (fleshy bare patches of skin) on their breasts.

Sage grouse depend on a variety of shrub steppe habitats throughout their life cycle, and are particularly tied to several species of sagebrush (*Artemesia* spp). Adult sage grouse rely on sagebrush throughout much of the year to provide roosting cover and food, and depend almost exclusively on sagebrush for food during the winter. If shrub cover is not available, they will roost in snow burrows. While average dispersal movements are generally less than 35 kilometers (km) (21 miles (mi)), sage grouse may disperse up to 160 km (100 mi) between seasonal use areas. Sage grouse also exhibit strong site fidelity (loyalty to a particular area), and are capable of dispersing over areas of unsuitable habitat.

A wide variety of forb (any herb plant that is not a grass) species are used as forage by adult sage grouse from spring to early fall, and hens require an abundance of forbs for pre-laying and nesting periods. An assortment of forb and insect species form important nutritional components for chicks during the early stages of development. Sage grouse typically seek out more mesic (moist) habitats that provide greater amounts of succulent forbs and insects during the summer and early fall. Winter habitat use varies based upon snow accumulations and elevational gradients, and sage grouse likely choose winter habitats based upon forage availability.

During the spring breeding season, male sage grouse gather together and perform courtship displays on areas called leks, primarily during the morning hours just after dawn. Leks consist of patches of bare soil, short grass steppe, windswept ridges, exposed knolls, or other relatively open sites, and they are often surrounded by more dense shrub steppe cover, which is used for roosting or predator evasion during the breeding season. Leks range in size from less than 0.4 hectare (ha) (1 acre (ac)) to over 40 ha (100 ac), contain several to hundreds of males, and are usually situated in areas of high female use. Leks used over many consecutive years (historic leks) are typically larger than, and often surrounded by, smaller and less stable satellite leks. Males defend individual territories within leks and perform elaborate displays with their specialized plumage and vocalizations to attract females for mating. Relatively few, dominant males account for the majority of breeding on a given lek.

After mating, females may move a maximum distance of 36 km (22 mi) depending on the availability of suitable nesting habitat, and typically select nest sites under sagebrush cover. Nests are relatively simple and consist of scrapes on the ground, which are sometimes lined with feathers and vegetation. Clutch sizes range from 6 to 13 eggs, and nest success ranges from 10 to 63 percent. Chicks begin to fly at 2 to 3 weeks of age, and broods remain together for up to 12 weeks. Most juvenile mortality occurs during nesting and the chicks' flightless stage, and is due primarily to predation or severe weather conditions. Shrub canopy and grass cover provide concealment for sage grouse nests and young, and may be critical for reproductive success.

Sage grouse typically live between 1 and 4 years and have an annual mortality rate of roughly 50 to 55 percent, with females generally having a higher survival rate than males. Up to 50 percent of all sage grouse mortality is caused by predation, from both avian (*e.g.*, hawks, eagles, and ravens) and ground (*e.g.*, coyotes, badgers, and ground squirrels) predators.

Prior to European expansion into western North America, sage grouse (*Centrocercus urophasianus*) were believed to occur in 16 States and 3 Canadian provinces (Schroeder *et al.* 1999a), although their historic status in Kansas and Arizona is unclear (Colorado Sage Grouse Working Group

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November 18, 2013
Submitted by Fred Fulstone

All the agencies are planning for management of what the Endangered Species act calls a Distinct Population Segment. As federal agencies, you are required to demonstrate that you are in compliance with the ESA by documenting that you are using the best available scientific and commercial data. You are also required to demonstrate how this bird is a DPS in accordance with the federal standards of discreteness and significance as defined by the ESA and subsequent policy. No proof of this. USFWS must do a nuclear DNA to clean this.

This bird is not endangered; there are thousands of them all over the Western United States. They are trying to make a big political deal out of this bird, just like they did by listing the Bighorn Sheep in the Sierras and removed all access to public lands. The sage grouse has already cost us four hundred million dollars and will cost us a billion or more.

Just think what good is this bird? It doesn't provide any of the basic needs of mankind.

All we have to do is to turn this sage hen situation over to the Wildlife Service, who would control the predators which would increase sage grouse numbers. It's been proven.

Please look at the Federal Register paper included here (dated August 24, 2000, third column underlined) page No. 51579. The following is what USFWS said about predators on sage grouse in the year 2000. It is still true today. Most juvenile mortality occurs during nesting and the flightless chick stage, and is due primarily to predation or severe weather conditions. Sage grouse typically lives between 1 and 4 years and have an annual mortality rate of roughly 50 to 55 percent with females generally having a higher survival rate than males. Up to 50 percent of all sage grouse mortality is caused by predation from both avian (e.g.

Hawks eagles and ravens) and ground (e.g. coyotes, badgers, and ground squirrels) predators.

A couple of days ago I was questioning a few of the people who live within a few feet of the big leks on the Desert Creek Area. They told me every spring, about hatching time the ravens and other avian predators swarm in by the hundreds for the big fiesta. They are flying over their houses morning and afternoon. Most of the people think the birds (sage grouse) are just holding their own, but need protection from predators. Some said the birds (sage grouse) come right into their patios and back yards. They think they are trying to get away from predators. They said they could hear their funny noises when they were matting on the leks. One girl said when her father lived there back in the 1970's there was thousands of sage hen. That was the time when we had good predator control, also we didn't have too many raven then.

If we list these birds it will be committing economical suicide for the west, 90 percent if public lands are located in 10 Western States.

If Ted Kock is forced to list the bird in the Bi-State area it will be destroying agriculture, mining, energy, and recreation in this area. This is discrimination and illegal. This whole thing is ridiculous, spending billions of dollars and time over a bird that gives no benefit to mankind. The Endangered Species Act must be repealed or amended or it will destroy the USA.

It was just said that Obama will have a National listing of Sage Hen of all 11 Western States.

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Remarks for the Bi-State meeting at Smith Valley Library on March 18th, 2013

Listing the sage hen would threaten our homes and our ranches and it would not save the bird. First we must improve sage hen habitat by controlling the predators that destroy the sage hens, their nests, and their chicks. Refer to enclosed article on Ravens. The birds right after hatching are very vulnerable to everything. Some reports say that we are losing 50% of our nests today and 70% of that loss is from ravens. (Mark Jensen, Supervisor, Wildlife Services, Reno Nevada).

Wildlife Services is in charge of predator control and they have lost 45% of their work force. At one time we had three trappers here – one in Smith Valley, one in Mason Valley, and one in Carson Valley. Today we have one trapper that has to cover all three valleys plus Fallon and Austin. We also don't have a lion hunter anymore.

THINGS WE NEED TO DO IMMEDIATELY TO SAVE THE SAGE HEN:

No 1. We must have more trappers to control ravens, coyotes, badgers, bobcats, and other predators.

No 2. We need to protect the grazing of livestock to control fires and enhance the sage hen. Refer to enclosed article on fires.

No 3. Where open grazing is allowed it accomplishes more than just providing feed for livestock

1. Livestock consumes the fuel that wildfires need to grow.
2. Livestock owners improve the water resource and create new water sites
3. Livestock grazing helps in the natural re-seeding, fertilizing, and cultivating of the grasses, forbs, and brush. This is necessary for the production of the sage hen and other wildlife. Sage grouse follow in the livestock footprints and into the bed grounds (especially sheep). These sage grouse feed on insects and other sources of nutrients left by the animals. It is common to see sage grouse chicks eating the pellets from the lambs which are highly nutritious because it is partially digested milk.

No 4. The livestock generally feed off the tall meadow grasses and forbs in the spring and then as the uplands dry the sage hen come down to the new growth of forbs and short green grasses in early summer. The livestock have to graze the meadows before the sage hen broods arrive to provide this benefit. The meadows that have been grazed are preferred by the sage hens.

No 5. You must remember that sage hen get much of their nutrients from the flies and insects which are abundant around livestock. This is not factored into the habitat plan.

No 6. Livestock on the range offers relief from predation because the predators prey on livestock. When livestock owners kill the predators the wildlife benefit along with the sheep and cattle.

NOW TO KIND OF SUM THINGS UP

Livestock grazing and predator control are the two most important tools we have to save and enhance the sage hen.

During those years from about 1955 to 1980 we had thousands of sage hen in Smith Valley, the Pine Nut Range, and Bodie Hills. Also during those years we had many trappers and the use of toxicants and we controlled the numbers of predators very well. During those years we had ten or more times the numbers of gazing animals on the Federal ranges than we now have and we had thousands of sage hen on the same areas. At the time from 1950 to 1980, when we had thousands of sage hen on the ranges, there were plenty of nutriments on the ranges to sustain the many birds so that proves the nutriments are there and the habitat was sufficient. As soon as the grazing permits were cut by the agencies the trappers and toxicant use was cut down and the sage hens started to disappear.

If you want to save the sage hen then contact the Wildlife Services in Reno. They are probably the most important government service to call in order to manage the sage hen.

We must not let this bird be listed under ESA. Our whole area would come under the control of the US Fish and Wildlife Service and those agency people would write an ESA recovery plan with no regard to local needs. The listing and regulations that follow would be a disaster economically and environmentally to our communities. Everyone would be hurt including livestock production, mining, housing control, recreation such as hunting and fishing, and just about every other aspect of our custom and culture and there is very little possibility of all those regulations resulting in more sage grouse.

The big problem is that the USFWS uses false science to get what they want and conspire with like-minded groups to do that.

For a very good example of how the ESA works, look at what happened in Klamath Falls area after the USFWS listed a sucker fish. This allowed the USFWS to implement their recovery plan and to give all the water in the Klamath Lake to the endangered species. That meant the farmers got no water for their crops even though they and the community businesses faced immediate economic destruction and citizens were forced into personal bankruptcy.

The USFWS was doing everything backwards. After the USFWS took over, about 80% of the sucker fish died.

What is the worse part? The National Academy of Science would later rule that the USFWS recovery plan was based on false science.

Without irrigation water 200,000 acres of farm land and 50,000 acres of wildlife refuge habitat dried up. This destruction was the result of the science used to list the sucker fish was corrupt.

Conclusion

Sagebrush is not a problem, we have plenty of it. Nevada is the sagebrush state. To increase the sage hen numbers and save our rural communities, we must perform the following:

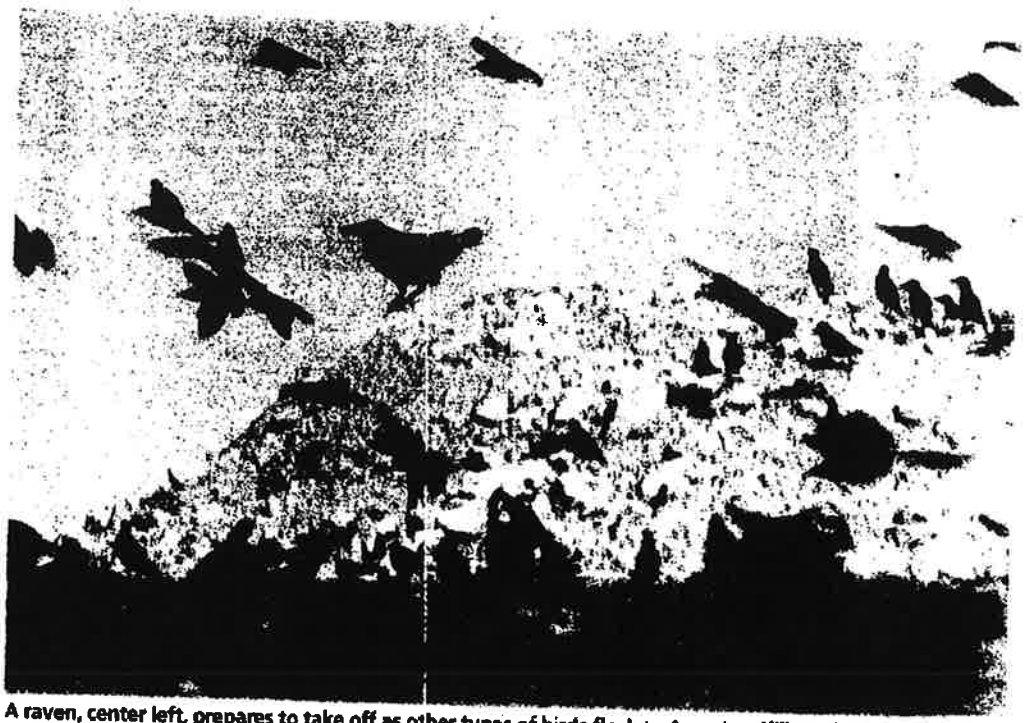
1. Don't list the sage hen
2. Control predators
3. Control fires
4. Improve water supplies
5. Increase our grazing area
6. Get DNA of Bi-State Sage Grouse and compare to others so we know what we are doing. We need responsible action.

Submitted by Fred Fulstone
Fred Fulstone
For F.I.M. Corporation
Smith, Nevada

Nevada's airborne irritants

Ravens threaten endangered wildlife, ranches

By Henry Brean
Las Vegas Review-Journal



A raven, center left, prepares to take off as other types of birds flock to Apex Landfill north of Las Vegas.

LAS VEGAS — Never mind the Super Bowl team from Baltimore, who defeated Northern Nevada favorites Colin Kaepernick and the 49ers.

In Nevada, real ravens pose a growing problem for ranchers, wildlife managers and two well-known species struggling to survive.

The clever and adaptable black bird preys on both the desert tortoise and the sage grouse — the former already protected under the Endangered Species Act, the latter on track to join it.

Efforts to save those species could mean death for more ravens. Already, the birds are killed by the thousands in Nevada each year.

Some people think far more ravens need to die. Others believe the wholesale murder of them won't accomplish anything — and it might just make things worse.

But the raven isn't waiting around to learn its fate. It just keeps reproducing, learning new things and expanding its range.

By some estimates, raven populations nationwide have grown by 300 percent in the past 40 years. In Nevada, the increase is thought to be more like 500 percent.

Humans

The raven succeeds on the spoils of our success. It feeds on our garbage, hunts from our transmission towers and follows our highways to new territory, dining on roadkill along the way.

"We're literally paving the way for ravens to move farther and farther into the desert," Jason Jones, a herpetologist with the Nevada Department of Wildlife, told the Las Vegas Review-Journal.

Common ravens grow to about 25 inches in length and weigh more than 2 pounds. They can live for more than 20 years and survive almost anywhere.

"You find them in Death Valley in the summer and at Prudhoe Bay, Alaska, in the winter," said John Hiatt, longtime conservation chairman for the Red Rock Audubon Society. "They're everywhere there is something to eat."

They're also among the smartest birds around. They solve puzzles, avoid threats and exhibit behavior that resembles play.

Shawn Espinosa, a staff biologist for the Nevada Department of Wildlife, said we should all be glad the birds don't have opposable thumbs.

"They might rule the world," he said with a laugh.

Killing ravens

Almost 20,000 common ravens have been legally killed across Nevada in the past 12 years, according to state figures.

Last year alone, the Department of Wildlife killed 1,997 ravens, three birds shy of the limit set by its U.S. Fish and Wildlife Service permit.

The raven, as it turns out, is a protected species as well. It falls under the Migratory Bird Treaty Act of 1918, which covers more than 80 percent of birds native to the United States. For the time being, state wildlife officials plan to keep killing as many ravens as the law will allow, though they acknowledged that such efforts might well be futile.

There is some research that suggests killing ravens could increase their concentrations — that when a mated pair is killed, two pairs of ravens will take over the open territory, effectively doubling the number of beaks to feed. Even so, the state has spent almost $150,000 to poison 6,850 ravens in 10 Nevada counties since 2007.

Hank Vogler has been running livestock in White Pine County for almost 30 years. He spread in Spring Valley, in the heart of sage grouse country, home to more than 6,000 sheep.

It's also a magnet for ravens which foul his water troughs, steal food from his rams and kill up to 100 of his lambs each year by pecking out their eyes and tearing at their umbilical cords.

"Let me go to the window," Vogler said by phone one recent Thursday. "Yep. Out where the rams were fed this morning, it's absolutely black with crows."

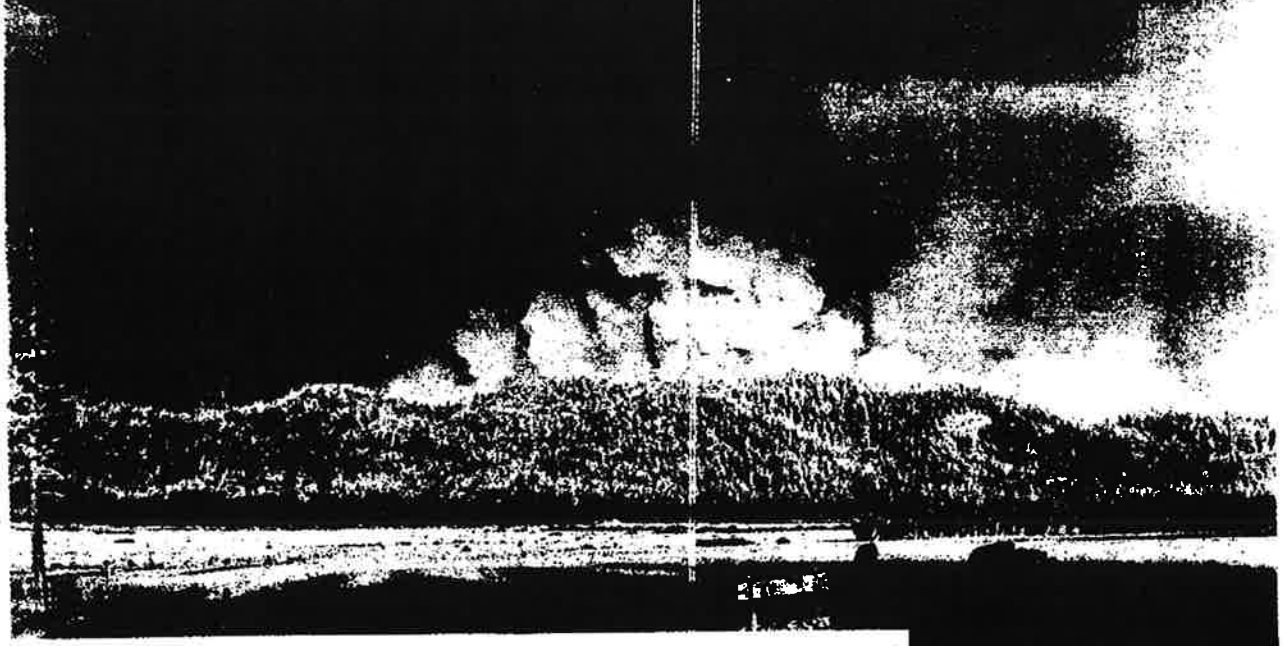
He can go out and blast away at them with a shotgun, but they're smart enough to keep their distance. If they see him with a gun, they will just wait for him to leave and go back to stealing feed.

As far as he is concerned, killing ravens has proven ineffective only because wildlife officials haven't killed enough of them yet.

"Do I want to see every crow on Earth, every raven, die? No," Vogler said. "But do we need 600 percent more of them than we did before? No."

2012 WILDFIRES

67,774 FIRES BURNED 9.3 MILLION ACRES NATIONWIDE, INCLUDING ABOUT 860,000 ACRES IN NEVADA. AT AN ESTIMATED $1.96 BILLION, IT WAS THE COSTLIEST YEAR EVER FOR FIRE SUPPRESSION. 2013 COULD BE WORSE.



By Jeff DeLong
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The sheer size of the wildfires that burned across a dry nation in 2012 helped drive the cost of quenching flames to an estimated $1.96 billion, making for the costliest year for fire suppression ever, experts said.

Fifty-one fires larger than 40,000 acres – including several that burned vast swathes of range in Northern Nevada – cost more than $580 million to extinguish, according to a summary released by the National Interagency Fire Center.

It's a costly and damaging trend that, with a second dry winter seemingly taking the West in its grip, shows every sign of continuing in 2013.

"It was extensive, among one of the more extensive in recent history," Ken Frederick, spokesman for the Boise-based fire center, said of last year's destructive season.

"It's estimated it will be the most expensive," Frederick said. "Any way you cut it, it's expensive."

Drought conditions in Nevada and across much of the nation combined with warm summer temperatures and often windy days to produce huge wildfires that burned long and charred vast islands of vulnerable terrain, Frederick said.

While the numbers are still preliminary, the estimated $1.96 billion to fight fire on federal land in 2012 would surpass the previous record of $1.92 billion in 2006, Frederick said. The bulk of the cost – $1.5 billion – was spent to battle wildfires on land managed by the U.S. Forest Service. Another $460 million was spent to fight fire on Bureau of Land Manage-

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INSIDE

After coming in $400 million over budget last year, the U.S. Forest Service says it might let more fires burn instead of attacking every one of them. **3A**

PAST NEVADA FIRE YEARS, ACRES BURNED

2011	417,400
2010	23,800
2009	33,300
2008	71,900
2007	890,100
2006	1.3 million

ABOVE: A plume of smoke from the Chips Fire rises above the Plumas National Forest in Northern California on Aug. 15.

School police could play larger off-campus role

Wildfires

Continued from Page 1A

ment land, much of that in Nevada.

More than 9.3 million acres burned, roughly matching the amount of land charred in 2007 and only surpassed by the 9.8 million acres burned in 2006.

The second-largest fire in the country last year was the lightning-sparked Holloway Fire, which burned more than 460,800 acres in both Nevada and Oregon.

That fire burned for a month and cost more than $9.1 million to suppress, according to the center's summary.

The Holloway Fire and two other large lightning fires that burned in Nevada in August, the Bull Run Complex and the Dallas Canyon Fire, cost nearly $17 million to suppress combined.

In some cases, fires burning in remote locations grew so large in part because firefighting resources were engaged fighting other blazes where lives and neighborhoods were at risk, Frederick said.

"It's very typical those types of fires will get a lower priority than fires that are threatening homes," Frederick said. "We simply don't have the army of resources it takes to combat a large number of fires."

A snowy December left many with high hopes 2013 would produce fire hazards at diminished levels from 2012 but a remarkably dry January and February has largely dissolved such optimism, said Nevada State Forester Pete Anderson.

He predicts another busy fire season for the Silver State and others parts of the country.

"We had a lot of high hopes but unless something turns around, it looks like we're going to be pretty dry," Anderson said. "I know the Forest Service and BLM are both very concerned. You just never know where that fire is going to start and who is going to be impacted."

"I'd say we're looking at something comparable to last year. It's been pretty dry," Frederick agreed. Early season fire danger will be dictated to a large degree by what happens in the spring and how mountain snowpacks melt, he said.

Whatever happens in 2013, studies indicate a warming climate could bring fire seasons of the future that significantly surpass what occurred last year, Frederick said.

"It won't be surprising if we start to see 10- to 12-million acre fire seasons," he said. "It could happen. It may well happen."

Photo 1. In our tests, any sheep which ran from coyotes usually were pursued and attacked. Coyotes generally select lambs over ewes if they have a choice.

Photo 2. Our coyotes usually attacked by running alongside fleeing sheep and biting them behind and below the ear. Then they braced their feet to stop the sheep from running. In this picture two 2-year-old coyotes are attacking a 90 lb. ewe.

Cover story

How Coyotes Kill Sheep

By Robert M. Timm and Guy E. Connolly

COYOTE PREDATION is a serious problem for many sheep ranchers in North America, but the act of predation is seldom witnessed under range conditions. Therefore, the sheep-killing behavior of wild coyotes has received little study. In experiments with captive animals, we obtained photographs which illustrate what we believe to be the usual mode of coyote attack on sheep. The resulting wounds are characteristic of coyote predation, even though dogs or other predators may sometime inflict similar wounds.

Photo 5. The throat attack pattern of coyotes leaves characteristic lesions which may or may not be externally visible. This coyote-killed ewe showed few external wounds, but sub-cutaneous examination revealed extensive tissue damage and hemorrhaging in the larynx region. Tooth punctures can often be found in the overlying skin.

The 12 coyotes used in this study were either captured as pups or born in captivity. At the time of these trials, eight of the animals were 2 years old and four were yearlings; none had had previous hunting or prey-killing experience. Nevertheless, five of these coyotes killed and fed upon lambs at the first opportunity. Three more coyotes, which did not attack sheep

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Robert M. Timm is currently Extension wildlife specialist, University of Nebraska, Lincoln; and Guy E. Connolly is wildlife research biologist, U.S. Fish and Wildlife Service, Wildlife Research Station, Twin Falls, Idaho. The research was done when both authors were at the University of California, Davis. The report is a contribution of Western Regional Research Project W-123, "Evaluating Management of Predators in Relation to Domestic Animals". The work was supported in part by the USDA Agricultural Research Service, Western Regional Laboratory. The authors thank D. A. Wade, W. E. Howard, W. M. Longhurst, R. Teranishi, and E. Murphy for advice and support; A. H. Murphy, D. T. Torell, and A. Hulbert for sheep; M. Vann and C. Berry for coyote pups; J. Fammatre for assistance; and M. Beaucage for photograph number 4. Reprinted from RANGEMAN'S JOURNAL, August 1977, by permission of the Society of Range Management.

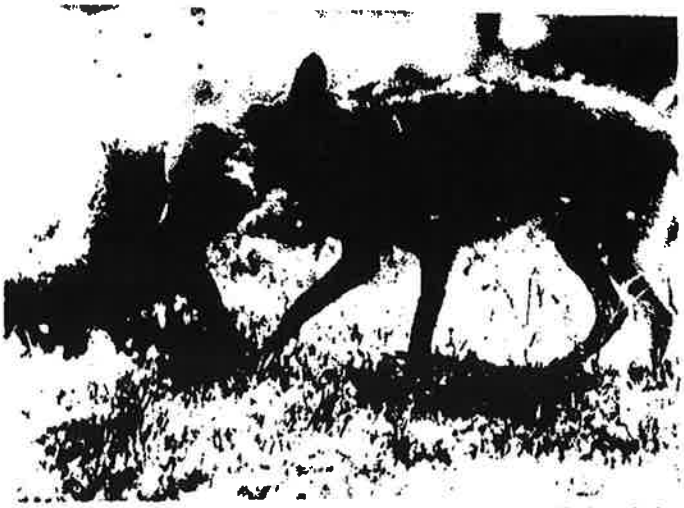

Photo 3. As soon as the coyotes arrested the flight of the sheep, they shifted their bite toward the sheep's throat. Once a firm grip was secured in the larynx region, the coyote simply held on and waited for the sheep to succumb. This manner of attack appeared to cause death primarily by suffocation, although blood loss and severe tissue damage also occurred. The time from onset of attack to death of the sheep or beginning of feeding, which ever occurred first, averaged 13 minutes. In 24 of the 25 fatal attacks, the neck and throat region was the main point of attack.

Photo 4. As soon as the sheep stopped struggling, the coyote(s) began feeding. On 9 of 21 kills where feeding was observed, the coyotes entered the body cavity and ate intestines and other viscera. They also fed upon the rump or hind leg (10 cases), the neck (7), front leg and shoulder (7), head (6), and other sites. On the average, each coyote fed for 25 minutes and ate about 4 pounds. Coyotes fed just before tests killed sheep but did not feed on them.

at first, did so in later tests. Of the 11 coyotes which were tested singly against individual 30 to 70-lb. lambs, eight killed the lambs.

In our tests, one to four coyotes were released into a 0.4-acre pen with 1 to 6 sheep, usually for 2 to 5 hours. The coyotes killed one or more sheep in 22 of the 46 tests. For the tests in which a fatal attack occurred, the time from release of coyotes to onset of attack varied from 1 to 154 minutes, with an average of 47 minutes. Of the coyotes tested individually with single lambs, the dominant animals (2-year-old males and the females paired with them) attacked most frequently. Yearling males attacked less frequently, and the two unpaired females did not attack sheep.

While we cannot be sure that wild coyotes will sheep in exactly the manner we observed with captive animals, the wounds resulting from our tests resembled those reported by many workers who studied coyote predation under range conditions. Therefore, we believe that the killing patterns we saw are generally representative of coyote predation on sheep.

On ranges where mountain lion, black bear, and bobcat predation is improbable, tissue damage, tooth marks, and hemorrhage in the larynx region on sheep carcesses is commonly indicative of coyote predation. However, coyotes sometimes attack the hindquarters of sheep. Dog-inflicted wounds seem to be more variable than those caused by coyotes. It is reported that dogs tend to attack the hindquarters, flanks, head, and/or abdomen of the sheep and seldom kill as cleanly as do coyotes. Wounds caused by dogs can usually be recognized as such, but at times they are indistinguishable from those made by coyotes. In such cases, tracks and other evidence at the scene often indicate which species of predator caused the damage.

Photo 6. A coyote consumed about 5 pounds from the rump of this 70 lb. lamb without killing it. We have seen range sheep with similar wounds. Of 25 coyote kills we observed, this was the only case in which the attack was not directed primarily to the neck and throat area of the sheep. Extensive feeding on the rump and hind leg, as shown here, also occurred on about half of the sheep killed with the customary throat hold.

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February 25, 2012

"I'm not exaggerating, there were thousands"

THE INTRODUCTION OF AGRICULTURE AND ITS IMPACT ON SAGE GROUSE

By all accounts, sage grouse were rare when Europeans first entered the Great Basin, as I documented in two earlier reports.

However, the populations of sage grouse in Nevada rapidly increased following the introduction of agriculture and livestock in the mid to late 19th century. "Clouds" of birds, creating "thunderous" noise as they concurrently rose into flight, are recorded by the 1880's.

For example, from interviews of "old timers" published by the Northeastern Nevada Historical Society: "Sage chickens (sage grouse) were so plentiful in the 1890's…they clouded the sky…the birds were always thick in the meadows. As I passed by, they would rise up like a bunch of blackbirds…oh they were thick." (George Gruell interview of Syd Tremewan, 1964).

Another: "When we lived on Gance Creek (around 1900) there were lots of sage hens. I have seen them fly up the mountain right behind our house…they sounded like thunder…I am not exaggerating, there were thousands." (George Gruell interview with George Nelson, 1966).

For a more scientific documentation of this huge rise in sage grouse during this time frame, Robert "Bob" McQuivey, a 30 year NDOW biologist, by literally reviewing all of the early newspapers, journals and laws passed in Nevada, has documented this population explosion. I have read some of his extensive research, which I am currently attempting to get published. In a nutshell, it confirms the above observations.

So, what caused this dramatic change, from almost nothing to abundance?
1. Habitat manipulation and expansion, especially meadows and man-made hayfields.
2. The mechanical removal of sagebrush and pinyon/juniper trees for primarily fuel.
3. The introduction of non-native plants, especially common dandelion, alfalfa, and other forbs.
4. Livestock grazing.
5. Stable supplies of water in areas previous dry or intermittent.
6. Predator control.

It should be noted none of the man-made changes were done intentionally to benefit sage grouse. It was simply coincidental.

HABITAT CHANGES. As settlers started to quickly dot the Nevada landscape, one of their first acts was to create a meadow of sorts for their domestic animals. For large ranches it was to primarily grow hay and expand lush grazing areas. Yet even the smallest start-up ranch had horses and generally a milk cow or two. By fencing an existing meadow, finding a level piece of sagebrush covered ground, damming the local spring or stream, and irrigating, meadows were both expanded and created new.

As is well documented, sage grouse have a symbiotic relationship to meadows. They especially relish certain forbs (most of us would call them "weeds"), and insects common on meadows.

However, when meadows are not basically "mowed down", sage grouse avoid them. Livestock usage, by eating the plants, actually increases sage grouse usage. For example, from "The Relationship of Cattle Grazing to Sage Grouse", a thesis done at UNR by Carol Evans in 1986: "Klebenow (1982) found that birds tended to avoid meadow areas of dense rank vegetation, but would use the areas once they were "opened up" by grazing. Oakleaf (1971) reported that heavily grazed meadows...were utilized by sage grouse, while succulent areas of ungrazed meadows...were not used as feeding areas. After cattle grazed and left a meadow, sage grouse were observed to concentrate there in greater numbers than before the grazing..." (DeRoucher, 1980)."

This flies in the face of the common misconception that grazing harms sage grouse. As Evans noted: "During the last three surveys, observed use of grazed meadows was significantly higher than expected."
Why? "Grazing by cattle prior to the cessation of plant growth...increases the quality of the food forb resources for sage grouse. Grazing increases the succulence of forbs by interrupting and delaying maturation. New leaf tissue is higher in crude protein...than mature tissue. Sage grouse appeared to seek sources of succulent forbs by selecting for meadows grazed by cattle."

NEW PLANTS: non-native plants can be harmful, like cheatgrass, or beneficial. Common dandelion, just like the ones you find in your lawn, is not native to Nevada. The good news: sage grouse love to eat it. Food studies of sage grouse show it to be a primary and dominant dietary item today. As Evans noted: "A study of this unique forb (dandelion) might yield important insights into how the environment for sage grouse has changed and how sage grouse have responded...the distribution of dandelion is closely tied to grazing...it increases with grazing and is noticeably less abundant in communities protected for long periods...dandelion unlike other forbs, retained its succulence long after maturation...dandelion is an exotic and not native to sage grouse habitat..."

Other plants introduced include alfalfa, which also is highly attractive to sage grouse; as are the insects these new man-made meadow complexes attracted. All in all, the huge increase in meadows or meadow- like fields and hay producing areas were the primary catalyst for sage grouse expansion, all done together with livestock grazing.

MECHANICAL REMOVAL OF SAGEBRUSH, primarily for fuel, also benefitted sage grouse by removing older less productive plants and allowing younger more succulent plants to grow. As recorded in 1877: "Sagebrush is about the only fuel in this timber-less country and hundreds of thousands of cords of it are annually consumed…like the grand forests of the Sierras, the wild sage of the Great Basin is rapidly disappearing and as it is a plant of exceedingly slow growth, it is not improbable that it may ultimately become extinct…" (from the "Tuscarora Times Review" as quoted in McQuivey's work).

This also helps explain why areas recorded by the early explorers as vast seas of sagebrush were later described as grass dominated by the 1890's. The fear of sagebrush going extinct was obviously grossly exaggerated, and its rapid recovery was a boon for the sagebrush-eating sage grouse, as the younger plants and re-growth were much more productive in the leaves they eat, especially in winter. The removal of Pinyon/Juniper trees over much of Nevada during this same time frame had much of the same effect.

WATER DEVELOPMENT, allowing livestock to graze areas otherwise off limits due to an absence of consistent drinking water, was also a boon for sage grouse. Windmills, stock ponds, spring improvements, earthen dams in strategic spots to catch run-off, and irrigation of formerly sage covered flats converted to hay meadows all greatly expanded habitat availability for sage grouse.

PREDATOR CONTROL also likely boosted sage grouse production. For example, the early Mormons, only two years after arriving in the Great Basin, "…sponsored a contest to kill off the 'wasters and destroyers'. About 800 wolves [coyotes], 400 foxes, 2 wolverines, 2 bears, 2 wildcats, 37 mink and several thousand hawks, owls, eagles and crows were killed in the hunt. One dollar in tithing was offered on a continuing basis for each wolf or fox skin." (From Arrington, "Great Basin Kingdom", page 59). Virtually every cowboy, sheepherder, rancher and ranch boy carried a firearm and shot every predator they crossed. While today condemned to a certain extent, this action likely contributed strongly to the rapid expansion of sage grouse into its newly enhanced habitats.

All in all, agriculture and ranching in the Great Basin was the catalyst for the noted huge increase in sage grouse in Nevada. As the small ranch complexes were slowly eliminated from Nevada by economic conditions as well as the Taylor Grazing Act and other government actions, the smaller man-made meadows dried up as well. Grazing, predator control and maintenance of various related stock water developments also declined.
Declined, yes, but not eliminated entirely. (At least not yet). Much of these agricultural improvements remain that still greatly enhance sage grouse habitat, and although down in number compared to the highs described, sage grouse are still significantly above the historic low numbers noted by the first explorers.

While attending a [Nevada] Governor's Sage Grouse Conservation Team meeting, I asked de-facto leader, Nevada Department of Wildlife (NDOW) biologist Sean Espinosa what in his view is the best sage grouse success story in Nevada since the team was formed in 2000. He stated: "Smith Creek Ranch."

Considering the fact that many government people have made it clear they feel the livestock industry is the cause of the sage grouse decline, the irony is huge. Smith Creek Ranch in central Nevada is a working cattle ranch and has been for almost a century and a half. (Incidentally, I agree wholeheartedly with Espinosa's opinion; Smith Creek Ranch is loaded with sage grouse. I have personally seen several hundred birds there myself.)
The ranch, as so many Nevada ranches once did, has a man-made reservoir and irrigates about 1200 acres – a man-made meadow complex. I have spent a great deal of time there, and seeing several hundred sage grouse on this meadow is not uncommon. NDOW has documented more than 500 sage grouse on this man-made meadow at one time. When the ranch was purchased by the current owner in the late 1990s, the meadow was "dirt". By irrigating, a hay/grazing meadow was soon home to hundreds of sage grouse (and cattle), at a spot you would have been lucky to see a dozen birds a decade or so earlier.

Consider: multiply this creation of a meadow and grazing it (to stimulate plant production; gardeners call this 'pruning'), as early Nevada ranchers did in nearly every canyon with some water starting in the mid 19th century, and you will begin to understand why the populations of sage grouse went from next to nothing to "clouding the sky" in only a few decades. Think of it as Smith Creek Ranch on steroids.
Agriculture and livestock bad for sage grouse? History says otherwise.

Sincerely,
Ira Hansen
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"Raven numbers have increased 1500% in areas of the western United States within an approximate 25 year time period." – Idaho State University, 2005

RAVENS AND SAGE GROUSE

July 5th 2012

SAGE GROUSE DECLINE: Populations of sage grouse have been in decline for several decades and "habitat loss" is as a rule blamed. Today they are being seriously considered for placement on the "endangered species" list by the Federal Government. Even in states with excellent habitat available – such as Nevada – bird numbers have shown a similar trend.

As several studies have noted adult sage grouse survival is generally not a problem. Recruitment – how many young birds join existing adult populations – has been documented to be poor. Consequently several recent studies, including two especially pertinent for Nevadans conducted in Elko County by Idaho State University, have attempted to address why.

"Predator control" is today a major topic of debate. The idea of removing predators, once the catch-all answer for downward trends in wildlife populations, is today regarded by college educated wildlife biologists as an anachronism, a holdover of a less educated past. Consequently most modern wildlife biologists seem to go to great lengths to avoid even discussing using predator control as a tool in their management arsenal.

Yet, examples of predators having long term impacts can be substantial and documented. When for example a primary food source is supplied unintentionally by man, secondary food sources can suffer catastrophic declines without a corresponding decline in the predator's population.

The increase in ravens in the western United States has been nothing short of phenomenal. A 300% increase in general has been noted, with 1500% increases documented in certain areas. Much of this increase has come about from man-supplied food sources.

This trend was noted in one of the Elko studies: *"Generalist predators* [such as ravens] *that reach high numbers in human altered habitats are of great concern because they can reduce prey populations* [such as sage grouse] *and these predators have been shown to continue depredating bird nests even at low prey densities."*

In plain English, even when sage grouse decline sharply in numbers because the ravens are eating them, as long as the ravens have other food sources, the raven populations are not affected by the declines in sage grouse.

The impacts ravens have on sage grouse is in truth old news. A 1948 study conducted by the Oregon State Game Commission concluded: *"The greatest single limiting factor of sage grouse is nest predation by ravens. While other predators do contribute to their toll, this study showed that the raven was the single greatest limiting factor and the control of winged predators is an essential element in sage grouse management".*

The 1948 Oregon study, in brief, had a "control" area in quality sage grouse habitat where raven populations were substantially reduced. Another very similar area was left alone with no raven removal. The results: *"Ravens again proved to be the chief limiting factor of sage grouse, and raven control the most feasible management method on increasing grouse populations. Five and five-tenths percent nesting success on an uncontrolled area as compared to a 51.2% success on an area where ravens and other avian predators were controlled is a strong indication of the raven's effect on this species."*

History repeats itself: the 2005 Elko study, conducted by Idaho State University, while couched in more "politically correct" jargon, reached very similar conclusions, again using the control/no control methodology: *"Sage grouse nest failure and observed raven predation of sage grouse nests were associated with indices of raven abundance...our findings should raise some conservation concern considering that raven abundance has increased an estimated 300% in the past 27 years in the United States including reports of 1500% increases within an approximate 25 year period in areas of the western United States".*

Clel Georgetta, writing about the domestic sheep industry in his Western history classic "Golden Fleece in Nevada" made an interesting observation. Written in 1968, he stated "*The crow* [raven] *is a newcomer. He is not a native of the state. It is believed there was not a crow in all Nevada until after the First World War when automobiles began crossing the country. All along the road jackrabbits were killed by cars. The crows followed from one rabbit to the next one, all the way out west. Now Nevada has many thousands of crows and they form one of the greatest pests at lambing time."*

Georgetta is wrong on no ravens in Nevada as their presence was well noted by the early immigrants for similar reasons – they followed the emigrant trail eating dead draft animals and livestock. Nevertheless his observation, from a man native to eastern Nevada, whose father was head of one of the pioneer ranching families of this State, shows they were very scarce.

Interestingly, the time frame he notes for the raven showing up in Nevada, WWI, which ended in 1918, matches almost exactly the date for an overall decline in sage grouse populations in the Oregon study mentioned earlier. They noted a gradual decline beginning in 1919 which continued to the years of their study, 1946-1947.

Incidentally, most people in Nevada, including myself, cannot distinguish a "crow" from a "raven" although they are two distinct species. Thus people like Georgetta lump them together.

STUBBLE HEIGHT AND PREDATION: One of the new theories on protecting sage grouse nests from avian predators is to leave "stubble", i.e. unconsumed grass and weeds, among the sage brush plants sage grouse typically nest under to provide concealment for nests.

While sounding plausible at first, this is probably the worst possible thing we could do, and I highly suspect the motive for pushing this particular pseudo-solution is a back-door attempt to remove livestock from the ranges. It is a terrible idea in that if carried out, the fire danger would increase exponentially; the bulk of the grasses and forbs today are combined with cheatgrass or in reality are totally composed of cheatgrass.

Once you start leaving the recommended minimum height of eight-inch-high dry cheatgrass stubble, you virtually guarantee fire will sweep through that sage brush community, destroying the habitat completely for sage grouse. In short, no sage, no grouse.

It should be noted as well that the peak historic sage grouse populations in Nevada, when descriptions of "clouds of birds" and "thousands of sage hen" were noted was also the time frame of unlimited and totally unrestricted grazing by - no exaggeration here - millions of sheep and hundreds of thousands of cattle and horses. If "stubble height" is so critical for protection, how did they survive and actually prosper in the very same time frame that by all accounts Nevada was so severely overgrazed?

The 2010 Elko study, again conducted by Idaho State University, discovered that increased stubble height actually ***increased predation*** of nests by non-avian predators. "*We also found that badger predation increased at nests with greater visual obstruction.* [After ravens, badgers were found to be the most destructive predator of nests, eggs and young birds]. *Other studies have found negative or no relationships between nest survival and grass height, grass cover, shrub height, canopy cover, understory cover, and species of nesting shrub*".

In truth, not only does stubble increase fire danger, but aids additional predation as well. Hardly a well thought out "solution".

In conclusion the logical steps to help restore sage grouse populations is to reduce raven numbers, by first doing what is practical, i.e. cover or destroy man-provided food

sources; second to use selective predator control in key sage grouse habitat, probably through USDA provided professional trappers; and three, allowing and encouraging shooting and hunting seasons for crows, even possibly a bounty system of some type, while looking to get out of or get variances on the international 1918 Migratory Bird Treaty, which calls for raven protection.

To my recollection, crow hunting as a means of protecting sage grouse started in the 1980s. Idaho was one of the first states to legalize it. The obvious question: how can you tell unprotected crows from protected ravens?

My good friend Mike Meizel, an avid trapper and outdoorsman and former Chief of Buildings and Grounds for the State of Nevada, posed that question to an Idaho Game Warden in the late 1980s. This particular Warden, blessed with good old common sense and aware of the damage ravens were causing, wryly noted "crows are the ones that hit the ground"!

Beware of the simplistic response you will get from certain biologists when raven removal is suggested. "Yes" they will say, "we know ravens eat the eggs and removal helps with that but the *problem* is the *juveniles* that survive past nesting are not surviving to full adulthood. Something in the *habitat* is the problem."
Ok, then what is that *problem* specifically? The tangible discussion typically ends about there and a series of nebulous theories – none of which seem to focus on the likelihood of *additional predation* – takes over. Not a single study I have read has suggested starvation as the cause of juvenile grouse not making it to full adulthood. In fact food studies for sage grouse state the opposite; there is a bit of a mystery why there are not many times more grouse as the studies show they eat only token amounts of their potential food supply. "Habitat" per se is NOT the problem.

Currently thanks to the mental roadblock the words "predator control" causes among most of today's wildlife biologists, virtually every possible scenario, no matter how outlandish or poorly thought out, is placed ahead of predator removal on the "to-do" list. Indeed, several proposals call for removing from the public domain sage grouse population enhancement tools, most notably livestock grazing and agriculture despite strong evidence these greatly increased sage grouse populations in Nevada.

As I have documented in other papers, sage grouse were all but non-existent when white man first arrived in Nevada. Following the introduction of landscape modifying and landscape enhancing changes, especially the introduction of the livestock range industry and all that came with it – including predator control - sage grouse populations exploded.

Based on early explorer journals describing Indian diet and wildlife they observed, two of my earlier reports detailed the fact Nevada had next to no sage grouse comparatively speaking. For additional facts based on Indian diet, I have completed a careful review of Julian Steward's 1938 report on Indian practices, including food sources, before white contact. Taken from interviews Steward did with older Indians in the 1920's and 30's,

and covering virtually all of Nevada, it is a wealth of first hand information from the Indians themselves and the results on sage grouse will be of interest to those seeking facts rather than fables presented by some about the "good old days!"

I will report on that soon. I will also be reporting on the impacts on sage grouse populations caused by crested wheat seedings.
Please feel free to contact me about any aspects of these reports, copies of past reports and feel free to circulate them as you see fit.

In the meantime, we need to give raven removal a strong seat at the "save the sage grouse" table. I strongly believe that not only can we stop the decline in their populations, but using the past as our guide, begin rebuilding. *Nevada could be a model for enhancing sage grouse populations.* We simply need the leadership to boldly experiment and challenge the bureaucratic choke-hold on methodology. Rather than wringing our hands over "saving" some token remnant, why don't we focus on what works? We can expand our sage grouse populations. *The answer is in our own past!*

Sincerely,
Assemblyman Ira Hansen
District 32

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ASSEMBLYMAN
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February 21, 2012

LIVESTOCK GRAZING AND WILDFIRE

At our January 27, 2012 Public Lands Committee meeting, a briefing paper by Bob Sommer, Fire Staff Officer for the Humboldt – Toiyabe National Forest, U.S. Forest Service, was read into the record. A single paragraph caught my eye: "…in 2007, the University of Nevada Cooperative Extension Service issued a report titled "Northeastern Nevada Wildfires 2006, part 2 – Can livestock grazing be used to reduce wildfires? They concluded "…livestock grazing is not a panacea for wildfire reduction on Northern Nevada rangelands."

I had read the 2006 UNR report mentioned and recalled a quite different conclusion. In fact, the UNR report reads: "Can livestock grazing reduce the risk of large recurring wildfires? In a word *yes*, but with limitations…In site specific situations, livestock can be used as a tool to lower fire risk by reducing the amount, height and distribution of fuel. Livestock can also be used to manage invasive weeds in some cases and even to improve wildlife habitat. This *under-utilized tool* (emphasis mine)…"

In short, while grazing is not a "panacea", (which means "cure-all") it is a valuable tool and in the opinion of the authors of the 2006 UNR report an "under-utilized" tool as well.

The basic question: how can we reduce the main cause of the million acre fires, the alien cheatgrass? Cheatgrass has been in Nevada since the 1890's at least, yet the catastrophic fires did not start until the year 1999. For over a century the presence of cheatgrass did not result in fires of this magnitude. Why not? What did we do different then than now?

Also to consider is the business end of fires. As James Young, UNR range scientist for 43 years noted, "*Fire suppression [has become] a multi-million dollar business that reaches from the rangelands of Nevada to corporate America. It is not in everyone's interest to biologically suppress the cheatgrass-wildfire cycle on Nevada rangelands.*"

Today hundreds if not thousands are employed in a government funded range fire industry that was a token of what we see today when compared to only a little over a decade ago. The BLM/Forest Service fire budget is now in the hundreds of millions, and a range reseeding/recovery industry has been spawned as well, all relying paradoxically on a continuation of range fires. A conflict of interests exists; the successful long term solving of the

million acre fires means the elimination of employment for this dramatically expanded bureaucracy.

What is the impact of livestock grazing on cheatgrass and hence wildfires? In 2008 at UNR a symposium was held by the leading experts in range management. They published their conclusions in "Great Basin Wildfire Forum: The Search for Solutions." Here are several excerpts.

DR. PAUL TUELLER, professor of range ecology at UNR for 42 years: *"The extreme fire years in the recent past must be due, in part, to the noted reduction in grazing the forage base, resulting in significant fuel buildup. The lower and sometimes upper reaches of the mountain ranges have turned yellow as a result of post-fire cheatgrass establishment...Development of intensive grazing strategies is needed to allow utilization of cheatgrass and reduce future fuel loads. Grazing animals will be the tools that must be used to make desirable changes in vegetation."*

DR. LYNN JAMES, director of the USDA ARS plant research laboratory at Logan, Utah for 35 years: *"Fires depend on adequate fuels-grasses and certain shrubs. The larger the fuel load, the hotter the fire will burn and the more damaging it will be...An economical and efficient way to remove excess grass is with an on-off grazing system. Fuel loads are reduced, while producers benefit from forage consumed by their livestock. Other grazing strategies can aid in preventing or managing wildfires and controlled burns. Fires that do occur burn with reduced intensity and a general upward trend in rangeland condition is sustained."*

DR. KEN SANDERS, professor of rangeland ecology at the University of Idaho for 32 years: *"The third biggest threat is the reduction in grazing on public rangelands. If the proposed sage grouse habitat guideline that recommends leaving a grass stubble height of 18 centimeters is applied, it will not only result in an adverse economic impact on livestock producers ,but it will also result in increased, higher intensity wildfire due to a larger fuel load."*

DR. WAYNE BURKHARDT, UNR professor of range management, emeritus: *"For the past 40 years, the management strategy, at least on public lands, has been to reduce or modify livestock grazing on these annual grasses, presumably to allow the re-establishment of native bunchgrasses. This has proven to be disastrous. Pre-adopted annual grasses* [such as cheatgrass] *can out-compete native bunchgrasses for early spring moisture on arid range sites. Reductions in grazing on these rangelands have not promoted the establishment of native flora, but rather have allowed flammable fuel build-up and increased fire frequency, intensity and spread. These unnatural fires remove the sagebrush overstory, prevent shrub re-establishment and create the conditions for the establishment of monotypic annual grasslands on what should be a shrub/grassland vegetation community.*

Public land grazers have an important role in protecting the resource by reducing fire danger, by managing fuels and improving the health and productivity of the range. Grazing should be firmly established as a necessary tool in reducing fire danger. The public needs to understand that fine fuel reduction and weed control are positive aspects of grazing and that properly managed grazing is good for the land."

DR. SHERM SWANSON, professor, Department of Natural Resources and Environmental Science, UNR: *"The presence of grazing animals on the range should not be viewed as overgrazing, but rather as a valuable tool. When used properly, grazing can help achieve resiliency in desirable plant communities and responsible fire and fuels management."*

In USFS Fire Staff Officer Bob Sommer's briefing paper he also wrote: "After the Murphy fire, the Idaho BLM State Director put together a team from both Nevada and Idaho…The purpose was to look at plant communities and livestock grazing in relation to the Murphy fire. The team concluded that much of the Murphy fire burned under extreme fuel and weather conditions that likely overshadowed livestock grazing as a factor influencing fire extent and fuel consumption."

I bring this up as, while studying this question, I came across this quote from Dr. NEIL RIMBEY, professor and range economist at the University of Idaho. He wrote: *"A tour of Idaho's Murphy Complex fire and the Tongue Complex on Juniper Mountain in the late summer revealed graphic evidence that grazing may reduce fuel loads and even stop fires."*

Clearly, if both men are describing the same fire complex, and I believe they are, they seem to be reaching substantially different conclusions from what I assume are the same observations.

If fires require fuel, and the fuel causing the fires is cheatgrass, the goal to block fires then is to remove as much fuel – cheatgrass – as possible. Less fuel – less fire. And if cheatgrass has been around for over 100 years, and fires were relatively small and uncommon up until 1999, livestock must have been the source of keeping this fuel in check.

So why no giant fires prior to 1999? *This is why I am highly skeptical of the BLM and USFS.* The same "experts" that now assure us they have the solution are the same "experts" that got us into our current mess. Starting in the 1950's, the "experts" came in and told us the "range was over grazed" and the solution was a reduction of livestock. So they began to cut, small at first, huge by the 1980s and 1990s. Between 1982 and 1991, Nevada had a reduction of 180,000 head of cattle. The experts assured us this would reestablish healthy native plant communities and reduce the less desirable shrub species, primarily, ironically now, sagebrush. If you read the literature right up to the time of the massive fires, you will note the livestock industry was highly criticized for an alleged huge increase in sagebrush. Sagebrush and several other native shrubs are largely unpalatable for livestock. Hence, since they are not eaten and the more desirable plants are, they tend to increase in numbers, while the desirable palatable plants decline. This is especially ironic now in light of the fact the decline in sagebrush habitat is the primary reason the "experts" give as the cause to put sage grouse on the endangered list.

Every decade or so in the government land management agencies there is an almost complete turnover of "range scientists", as field personnel move up the management ladder, and a whole new crop of college-educated "experts" take their place. Yet Nevada ranches, most owned by the same families for generations, are "non-experts" totally at the mercy of their federal masters. This is not a put-down per se of all federal land management people, many if not most of which are good hardworking individuals. It is a statement explaining why I am highly skeptical of listening always to the "experts", as their track record in Nevada has been horribly bad.

I have always believed the people who will be most harmed by bad land management practices are the ranchers themselves, hence they have a strong financial incentive to insure the long term health of the ranges they use. It is the ranchers who have been the most vocal critics of the Federal policies, warning of exactly what has come to pass. Yet today, if our most recent meeting is an example, we are shunting aside the "non-experts" who actually live on the ground, and are once again being dictated to by "experts" getting their marching orders from Washington D.C.

Incidentally, I have absolutely no connection with the livestock industry. I am in fact a contractor living in Sparks. But I have a strong interest in the plant communities and wildlife of Nevada and have spent literally years in Nevada's backcountry. I have carefully read everything about these issues I can get my paws on (including the book "Cheatgrass" by Young & Clements. One of the few books, purchased in 2009, my wife teased me about buying. Not exactly on the NY Times best seller list!)

In conclusion, any reasonable person would agree using domestic animals to reduce the quantity and spread of cheatgrass is the best solution currently available. The government required massive reduction in AUMs and livestock turn out time frames must be reversed if we are serious about having a public rangeland composed of native plants. Our current trend insures massive fires almost indefinitely, a huge taxpayer subsidized "range fire" industry, and a future Nevada landscape composed of the dull yellow color of mono-typical stands of cheatgrass. Nevada will be the "Sagebrush State" no more.

Sincerely,

Ira Hansen
Assemblyman District 32

Coates - Virginia Hills report 9-2013

Articles

Greater Sage-grouse Nest Predators in the Virginia Mountains of Northwestern Nevada

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Abstract

Greater sage-grouse (*Centrocercus urophasianus*; hereafter, sage-grouse) populations have declined across their range due to the loss, degradation, and fragmentation of habitat. Habitat

alterations can lead not only to vegetative changes, but to shifts in animal behavior and predator composition that may influence population vital rates such as nest success. For example, common ravens (*Corvus corax*) are sage-grouse nest predators and raven abundance is positively associated with human-caused habitat alterations. Because nest success is a central component to sage-grouse population persistence, research that identifies factors influencing nest success will better inform conservation efforts. We used videography to unequivocally identify sage-grouse nest predators within the Virginia Mountains of northwestern Nevada, USA from 2009 – 2011 and used maximum likelihood to calculate daily probability of nest survival. In the Virginia Mountains, fires, energy exploration, and other anthropogenic activities have altered historic sage-grouse habitat. We monitored 71 sage-grouse nests during the study, placing video cameras at 39 nests. Cumulative nest survival for all nests was 22.4 % (95% CI, 13.0% – 33.4%), a survival rate that was significantly lower than other published results for sage-grouse in the Great Basin. Depredation was the primary cause for nest failure in our study (82.5%), and common ravens (*Corvus corax*) were the most frequent sage-grouse nest predator accounting for 46.7% of nest depredations. We also successfully documented a suite of mammalian and reptilian species depredating sage-grouse nests, including some predators never previously confirmed in the literature to be sage-grouse nest predators (i.e., bobcat and weasel). Our results indicate that, within the high elevation, disturbed habitat of the Virginia Mountains, sage-grouse nest success may limit the sage-grouse population. We recommend that management actions for the Virginia Mountains be designed to restore habitat to increase sage-grouse nest success and decrease anthropogenic subsidies of ravens.

Keywords: *Centrocercus urophasianus*, common raven, nest survival, Nevada, sage-grouse, video-monitoring

47 Received: December 30, 2012; Accepted: April 1, 2013; Published Online Early: October 2013;
48 Published: xxx
49 Citation: Lockyer ZB, Coates PS, Casazza ML, Espinosa S, Delehanty DJ. 2013. Greater sage-
50 grouse nest predators in the Virginia Mountains of northwestern Nevada. *Journal of Fish and*
51 *Wildlife Management* 4(2):xx-xx; e1944-687X. doi:10.3996/122012-JFWM-110R1
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55 Short title: Greater Sage-grouse Nest Predators
56
57 **Introduction**
58 Range-wide declines in greater sage-grouse (*Centrocercus urophasianus*; hereafter, sage-grouse)
59 populations (US Fish and Wildlife Service 2010) point to a need to better understand sage-grouse
60 reproduction and factors that influence reproductive rates. Nest survival is a central component
61 of reproduction, and nest failure may limit sage-grouse populations (Bergerud 1988; Schroeder
62 1997; Schroeder and Baydack 2001). Nest survival explains more variation in sage-grouse
63 population growth rates than any other vital rate (Taylor et al. 2012). Nest depredation represents
64 approximately 94% of sage-grouse nest failures (Moynahan et al. 2007), which suggests that
65 variation in abundance and species of nest predators among areas influences sage-grouse
66 population size (Bergerud 1988; Schroeder and Baydack 2001; Beck et al. 2006).
67 Identification of sage-grouse nest predators based on diagnostic remains at the nest
68 (Holloran and Anderson 2003; Moynahan et al. 2007) and direct identification (Coates et al.
69 2008) indicate that sage-grouse nests are subject to a wide range of nest predators. Unfortunately,

predator identification based on nest and egg remains following nest depredation is subject to considerable error (Marini and Melo 1998; Lariviére 1999; Coates et al. 2008). Use of continuous video monitoring (Coates et al. 2008; Bell 2011) and remote digital cameras (Holloran and Anderson 2003) have increased our understanding of sage-grouse nest predators. Video-recordings of sage-grouse nest depredation indicate that female sage-grouse do not defend nests successfully upon discovery by meso-predators (i.e., badgers, skunks, ravens), the only type of predator so far unambiguously identified depredating sage-grouse nests (Coates et al. 2008; Bell 2011). Video-recordings of sage-grouse nest depredations have also clarified previous hypotheses regarding identity of sage-grouse nest predators originally formed from observations of nest remains. Research that identifies sage-grouse nest predators and estimates the timing and occurrence of nest depredation could contribute substantially to management and conservation decisions for sage-grouse populations. For example, the probability of a predator detecting a sage-grouse nest is often influenced by the quantity and quality of concealment cover around the nest (Schroeder and Baydack 2001; Coates and Delehanty 2010; Hagen 2011). Implementing targeted habitat management to improve concealment cover for nesting sage-grouse will be significantly more effective if managers know what the predator types are, when depredations occur, and at what frequency they occur.

Range-wide, sage-grouse populations are exposed to a suite of predator communities, the composition of which varies among regions. Our goal was to use video-monitoring to identify sage-grouse nest predators on the western edge of sage-grouse distribution where western Great Basin and eastern Sierra Nevada ecosystems meet and where habitat features and predator communities differ from the interior of the Great Basin. We deployed continuous video-recording systems at sage-grouse nests from 2009 – 2011 in the Virginia Mountains of

93 northwestern Nevada, an area with a sage-grouse population that breeds at relatively high
94 elevation and occupies the eastern flank of the Sierra Nevada mountains on the western edge of
95 historic sage-grouse range,

96 **Study Area**

97 This study area consisted of a topographically complex sagebrush-steppe ecosystem in the
98 Virginia Mountains of northwestern Nevada, USA (Figure 1), an area encompassing
99 approximately 676 km² with elevations ranging from 1218 – 2683 m. Mean annual precipitation
100 was 18.8 cm and temperatures ranged from 6.8 – 18.2°C from 2009 – 2011 (Western Regional
101 Climate Center). The U. S. Department of Interior, Bureau of Land Management (BLM)
102 administered the majority of land (588 km²) in the study area with the remaining portion owned
103 privately (88 km²). The Pyramid Lake Reservation borders the eastern portion of the Virginia
104 Mountains and California borders to the west. A sage-grouse hunting season existed until 2005,
105 after which the season was discontinued by the Nevada Department of Wildlife (NDOW) due to
106 declining sage-grouse numbers in the region. Cattle grazing occurred within sage-grouse nesting
107 areas during the latter part of the nesting season each year.

108 The vegetation community within the study area reflected a response to a fire (Fish Fire)
109 that occurred in 1999 and resulted in reduced shrub abundance and increased stands of
110 cheatgrass (*Bromus tectorum*). Lower elevation shrub communities were dominated by
111 sagebrush (*Artemisia* spp.) with overstory primarily consisting of big sagebrush (*A. tridentata*
112 spp.), Bailey's greasewood (*Sarcobatus baileyi*), horsebrush (*Tetradymia* spp.), and several
113 species of rabbitbrush (*Chrysothamnus* spp.). Higher elevation communities consisted of
114 montane shrub complexes with big sagebrush, Saskatoon serviceberry (*Amelanchier alnifolia*),
115 snowberry (*Symphoricarpos albus*), and antelope bitterbrush (*Purshia tridentata*) comprising the

116 common woody overstory species. Woolly mule's ear (*Wyethia mollis*), lupine (*Lupinus* spp.),
117 and arrowleaf balsamroot (*Balsamorhiza sagittata*) dominated the forb communities. Dominant
118 grass species included bluebunch wheatgrass (*Pseudorogeneria cristatum*), crested wheatgrass
119 (*Agropyron cristatum*), basin wildrye (*Leymus cinereus*), needle-and-thread grass (*Hesperostipa*
120 *comata*), Indian ricegrass (*Achnatherum hymenoides*), and cheat grass. Scattered stands of
121 pinyon-juniper woodlands consisting of singleleaf pinyon (*Pinus monophylla*) and Utah juniper
122 (*Juniperus osteosperma*) were found throughout the study area.

123 Over the course of this study, we observed several potential sage-grouse nest predators
124 including: common ravens (*Corvus corax*), American crows (*C. brachyrhynchos*), black-billed
125 magpies (*Pica hudsonia*), American badgers (*Taxidea taxus*), gopher-snakes (*Pituophis*
126 *catenifer*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), kit foxes (*Vulpes macrotis*), striped
127 skunks (*Mephitis mephitis*), and long-tailed weasels (*M. frenata*).

128 **Methods**

129 **Capture and Telemetry**

130 We captured female sage-grouse (n = 72) at nocturnal roosting locations using spotlights in
131 concert with handheld nets attached to 3-m extension handles (Giesen et al. 1982; Wakkinen et
132 al. 1992), and handheld net launching devices (SuperTalon®, Advanced Weapons Technology,
133 La Quinta, CA) during the spring and fall of 2008 – 2011. We equipped captured grouse with 18
134 – 22 g (< 3% body mass; Schroeder et al. 1999) necklace-style, battery-powered radio-
135 transmitters with 22-cm antennas bent back along the contour of the body to reduce interference
136 with flight (Advanced Telemetry Systems, Isanti, Minnesota). All grouse were captured and
137 handled under the auspices of the U. S. Geological Survey (USGS). We classified captured
138 grouse as adult or yearling based on plumage characteristics of the 9th and 10th primaries (Eng

1955; Dalke 1963). Sage-grouse were held for less than 30 min and were released at point of capture.

We relocated sage-grouse via telemetry using 3-element Yagi antennas and handheld receivers (Communication Specialist Inc. Orange, CA; Advanced Telemetry Systems, Isanti, MN). We circled sage-grouse while maintaining a 30 – 50 m buffer between the grouse and the observer to minimize disturbance to grouse except when female grouse were approached more closely during our efforts to locate nests of females. We recorded sage-grouse locations as UTM data derived from handheld global positioning system (GPS) devices. We attempted to relocate all female sage-grouse ≥ 2 times per week. Nests were located by visual searches after females were found in the same location on two consecutive relocation observations. Subsequent nest visits occurred every 3 – 4 days for the duration of that nest. Upon completion of a nest, we classified them as successful if ≥ 1 egg hatched (Rearden 1951) as determined by visual assessment of eggshell remains or observing ≥ 1 chick in the nest bowl (Table S1, *Supplemental Material*). Nests were considered to be unsuccessful when the entire clutch failed to hatch. We recorded depredated nests as partial depredation when ≥ 1 intact whole egg remained in the nest bowl or as complete depredation when all eggs were destroyed or missing from the nest bowl. Following depredation, we recorded scene characteristics including nest bowl disturbance, vegetation disturbance, eggshell and egg membrane remains, and any other pertinent evidence potentially implicating predator type.

Video-monitoring of Nests

Sage-grouse nesting behavior was monitored and nest predators were identified through the use of continuous video-recording systems and camouflaged day-night micro bullet true color cameras (Model ENC-100, EZ-Spy Cam, Los Angeles, CA). The cameras were equipped with

eight light-emitting diodes producing 950-nm wavelength infrared illumination, which is beyond the visible light spectrum for most vertebrates and sufficient for infrared-sensitive digital recording. Cameras were placed 0.5 – 1.0 m from the nest bowl and attached to existing vegetation when available or a camouflaged steel stake when vegetation was insufficient. Care was taken during camera placement to ensure that the entire nest was visible in the camera's field of view while avoiding disturbance to the nest and surrounding vegetation. Cameras were connected to single channel micro digital video recording devices (DVR; Model MDVR14, SuperCircuits, Austin, TX) placed approximately 30 m from the nest. Cables were buried 3 – 5 cm in the ground. The camera and recorder were powered by two marine grade deep cycle 12 V batteries. Batteries, DVR, and associated components were housed in weatherproof camouflaged boxes concealed under the canopy of a nearby shrub, approximately 30 m from the nest. Continuous images were recorded onto memory cards (16 – 32 GB) via digital video recorders (DVR) that were set to record 3 – 4 frames/sec. Frequency of our visits to nests was limited by battery life, not data storage. We approached each video-monitored nest every 3 – 4 days to replace batteries prior to depletion and also replaced memory cards. Nests that were not monitored with videography were also visited every 3 – 4 days (control) from approximately 30 m away to document nesting status and reduce bias in nest failure rate that could have resulted from a disparity between the number of nest visits for video and non-video monitored nests. Because the frequency of nest visits by researchers was every 3 – 4 days, the time between nest depredation and nest visits varied from a few hours to as much as four days. During camera installations and nest visits, we wore rubber gloves, rubber boots, and used scent masking sprays to reduce the possibility of attracting or deterring predators (Whelan et al. 1994). We used vegetation mimicking that of the associated shrub-steppe microhabitat to camouflage camera and

185 the storage box containing the DVR, batteries, and other components. Researchers diligently
186 watched for any potential predators during camera installations and nest visits. If any predators
187 were detected, we postponed approaching nests to avoid drawing attention to sage-grouse nests
188 that may influence probability of depredation (Vander Haegen et al. 2002).

189 We placed video systems at nests (*n = 39;* Table S1, *Supplemental Material*) based on
190 fewest estimated days of incubation from the nest initiation date, postponing installation until ≥ 3
191 days of incubation to reduce risk of female abandonment (Renfrew and Ribic 2003). Nest
192 initiation date was estimated based on radio-telemetry monitoring. We installed cameras at all
193 qualifying nests until all camera systems were deployed. Camera systems were moved to the
194 next qualifying nest following nest cessation due to hatch or failure. Nests receiving cameras
195 were randomly chosen and not selected based on nest accessibility. We were unable to install
196 camera systems quickly enough during early dawn when females take a brief recess from
197 incubation. Grouse were incubating when we approached to install cameras and we usually
198 caused grouse to flush. To reduce risks of abandonment and egg mortality, we refrained from
199 camera installations during inclement weather (i.e., extreme ambient temperatures, precipitation,
200 and/or high winds). On average, we spent 25 – 30 min completing camera installations before
201 vacating the nest site. Following nest fate (i.e., successful, abandoned, or depredated), we
202 continued to video monitor nests for up to 24 h to document any additional female behaviors or
203 animal encounters at the nest site.

204 **Data Analysis**

205 We estimated daily survival rate (DSR) and cumulative survival rate (CSR) using the RMark
206 package (R Version 2.13, www.r-project.org; Laake and Rexstad 2007; Table S1, *Supplemental*
207 *Material*) that implements Program MARK (White and Burnham 1999). We conducted the data

208 analysis in three steps. First, we examined variation in DSR explained by year. We compared a
209 model that included year as a group level factor to an intercept-only model. The most
210 parsimonious model was used as a base model for subsequent analysis. If these data supported
211 year as a group level factor, then we included this factor as an additive effect in successive
212 models which also included other factors of interest. Second, we compared a model that
213 consisted of a factor variable for first and second nests against the base model. The rationale for
214 this step was to pool nest attempts if we did not find evidence of a difference or restrict the data
215 set to first attempts only if a difference was supported. Third, we estimated differences between
216 nests with and without cameras. In this analysis, we compared a model with group-level factor of
217 camera to the base model. Because we postponed camera installation until ≥ 3 days of incubation
218 to reduce risk of female abandonment, we similarly excluded non-video monitored nests ($n = 15$)
219 under the same criterion until ≥ 3 days of incubation were achieved (Table S1, *Supplemental*
220 *Material*). In other words, nests that failed between first and second nest visits (3 – 4 days) did
221 not meet the standard for camera installation and we did not include these nests relative to
222 measuring any camera effect. To do so would have imposed bias because video-monitored nests,
223 by design, could not have failed during early incubation. Nests without cameras that met the
224 same criteria for nests with cameras ($n = 17$; (Table S1, *Supplemental Material*)) served as
225 controls. We calculated Akaike's Information Criterion (AIC; Akaike 1973) with second-order
226 bias correction for small sample size (c; Anderson 2008) to evaluate support for each model.
227 Model uncertainty was quantified by calculating differences between model AIC_c values (ΔAIC_c)
228 and by comparing model weights (w_i).

229 **Results**

Video-monitoring identified ravens, American badgers, coyotes, long-tailed weasels, Great Basin gopher snakes, multiple rodent species, and a bobcat visiting sage-grouse nests, although not all of these species consumed eggs. Video-monitoring also allowed us to observe total clutch depredation, partial clutch depredation, as well as successful hatches.

We monitored a total of 71 nests (n = 18, 2009; n = 20, 2010; n = 33, 2011; Table S1, *Supplemental Material*) from 2009 – 2011. A total of 61 (n = 15, 2009; n = 18, 2010; n = 28, 2011; Table S1, *Supplemental Material*) nests were first attempts, and 10 nests (n = 3, 2009; n = 2, 2010; n = 5, 2011; Table S1, *Supplemental Material*) were second nesting attempts. Cameras were installed on 39 nests (n = 6, 2009; n = 16, 2010; n = 17, 2011; Table S1, *Supplemental Material*). Of these, 30 were first nest attempts (n = 3, 2009; n = 14, 2010; n = 13, 2011; Table S1, *Supplemental Material*) and 9 were second attempts (n = 3, 2009; n = 2, 2010; n = 4; 2011; Table S1, *Supplemental Material*). Nest abandonment occurred on 7 (9.9%) occasions. Nest survival across all nests was 22.4% (95% CI, 13.0% –33.4%) as follows: 2009, 7.4% (95% CI, 1.2% – 21.6%); 2010, 13.2% (95% CI, 3.1% – 31.1%); 2011, 41.8% (95% CI, 22.3% – 60.3). Nest initiation rate across all radio-marked females and years was 88.8% ± 0.10. Mean clutch size was 7.19 ± 0.95 with mean clutch size for first and second nest attempts 7.13 ± 1.02 and 7.11 ± 2.37, respectively.

We recorded approximately 11,800 hours of female incubation, an average of 12.6 (SE = 2.02) days of video monitoring for each video-monitored nest. Predators were recorded at 17 nests. Fifteen (88.2%) of these nests were depredated and failed while two (11.8%) nests were partially depredated and one or more eggs hatched following partial depredation. Successful hatching was recorded at 21 nests. Equipment failure occurred on three occasions and nest fate was not recorded. Camera installation at nests did not cause nest abandonment insofar as

253 recorded females returned to nests and resumed incubation in all cases following camera
254 placement.
255 In step one of the analysis, we found year accounted for more variation in DSR (Table 1;
256 AIC_c $\omega = 0.93$) compared to the intercept only survival model (Table 1; AIC_c $\omega = 0.07$).
257 Therefore, year was included in all models as a fixed effect to account for inter-annual variation
258 (Table 1). Also, the base model for steps two and three consisted of the factor year. In step two,
259 model analysis did not support a difference in DSR between first and second nest attempts
260 (Table 1; $\Delta AIC_c = 1.90$) and, thus, we pooled first and second nest attempts in our analysis to
261 evaluate camera effects. In step three, we did not find support for an effect of camera presence
262 ($\Delta AIC_c = 1.79$). The base model ($\omega = 0.71$) was 2.4 times more likely to describe DSR compared
263 to the model including camera presence (AIC_c $\omega = 0.29$). Estimated cumulative nest survival for
264 nests with cameras was 38.2% (95% CI, 21.7 – 54.6%) and without cameras was 36.3% (95%
265 CI, 12.1 – 61.8%). The difference in variability between nest survival estimates for nests with
266 and without cameras results from the added precision obtained from videography on exactly
267 when a hatch or depredation occurred. Conversely, we were unable to determine the exact day
268 that a hatch or depredation took place for nests without cameras and we therefore selected the
269 midpoint between nest visits (3 – 4 days) which increased variation in survival estimates.
270 Estimated cumulative nest survival for all nests, which included 15 nests not available for
271 camera analysis, was 22.4% (95% CI, 13.0% – 33.4%).
272 **Video-Recorded Ravens**
273 Ravens ($n = 7$ incidents of ravens at sage-grouse nests) were the most frequent nest predator
274 identified by video-monitoring in our study and caused partial ($n = 3$) and full ($n = 4$) nest
275 depredation. Ravens were the only nest predator for which we observed complete egg removal

with no eggshell fragments or other remains left in the nest. In these cases, ravens carried away whole eggs. Following partial clutch depredations by ravens, grouse returned to their nests and on one occasion resumed incubation. Ultimately, all females abandoned the remaining eggs following partial depredation by ravens. We did not observe female grouse defending nests following discovery by ravens, although the camera view was limited to the nest bowl and areas immediately adjacent to it. One raven depredation occurred while the female was absent from the nest. The remaining depredations involved ravens flushing the incubating female from the nest. In one situation, a raven violently struck an incubating female and continued to harass the female beyond the nest bowl before removing eggs (Figure 2). We could not determine conclusively if raven depredations occurred from one or multiple ravens, but the rate of egg removal in some cases suggested that more than one raven was involved in the depredation. Timing of raven depredation occurred from 07:06 – 18:31 hours (i.e., during daylight hours).

Video-Recorded Coyotes

Depredations by coyotes (Figure 3A) occurred on three occasions, each resulting in complete nest failure. All coyote depredations were nocturnal, taking place from 21:31 – 23:50 hours. In each case, incubating females flushed from the nest, escaping capture by coyotes, and did not attempt to defend nests. In two coyote depredations, eggshells were left mostly intact except for large holes in the sides of the shells and shells were scattered within a 10-m radius of the nest bowl. The third coyote depredation left two empty eggshells with holes in the sides, and the fragments of crushed eggs within 5 m of the nest. Based on remains, it appeared that a few eggs were either consumed entirely or were carried away from the nest site. Egg contents were removed in all cases where egg remains were located.

Video-Recorded Badgers

We documented two badger nest depredations (Figure 3B) and both resulted in complete nest clutch loss. Incubating females flushed from the nests at 04:45 and 05:44 hours, respectively, did not attempt to defend nests, and were not captured by the badger. One badger depredation left three crushed eggshells partially buried in the nest bowl and five eggshells with large holes in the sides or tips and shells were scattered within 5 m of the nest bowl. In the other badger depredation, the badger consumed all but one egg during the night and then returned at 08:04 in the morning and removed the remaining whole egg from the nest bowl. One empty eggshell with a large hole in the side was found within a meter of the nest in addition to a crushed eggshell and eggshell fragments from other eggs. In both cases, numerous badger digs were located around the periphery of the nest bowl, but no cached eggs were located.

Video-Recorded Bobcat

One nest was depredated by a bobcat (Figure 3C). At 02:04 hours, the incubating grouse flushed from the nest. The grouse did not defend the nest and was not captured by the bobcat. The bobcat cautiously entered the view of the camera shortly after the grouse flushed and meticulously consumed the contents of all eggs ($n = 8$). After approximately 21 minutes, the bobcat left a neat, clean pile of crushed eggshell fragments inside the nest bowl. The nest bowl and surrounding vegetation were negligibly disturbed.

Video-Recorded Long-Tailed Weasels

Long-tailed weasels were recorded at two sage grouse nests sites, both of which led to partial depredations. At 07:51 a weasel entered the camera view of one nest (Figure 4) and the incubating grouse stood, but did not leave the nest bowl area. The female appeared to be defending her nest, but during the encounter one egg from the clutch was moved beyond the camera field of view. We could not determine whether the egg rolled out during the interaction

or if the weasel removed the egg. No egg remains were located near the nest site. The female resumed incubation following the encounter and continued to incubate for 18 more days before the nest failed due to depredation by an unknown predator.

The second weasel depredation occurred at 05:06 as eggs were hatching. The grouse stood but did not flush and appeared to defend her nest. During the encounter, the weasel was clearly visible, but we could not determine what, if anything, the weasel took from the nest. Ultimately, the female left the nest and our subsequent examination of nest remains identified one eggshell from a hatched egg and eggshell fragments from crushed eggshells. Subsequently, we located the female and found her brooding one chick. The remaining unhatched eggs in the nest were destroyed, perhaps trampled by the female sage-grouse during the encounter between the grouse and the weasel. This was a successful nest because ≥ 1 egg hatched (Rearden 1951) despite the partial depredation.

Video-Recorded Snakes

On two occasions Great Basin gopher snakes (*Pituophis catenifer deserticola*) entered sage-grouse nest bowls. On the first occasion (Figure 5A), during an incubation recess, a gopher snake of approximately 1 m length entered the nest bowl at 13:20 hours and attempted to consume eggs (Figure 5B and C) for approximately 1 hour, repeatedly mouthing eggs but not extending its gape over the eggs. Ultimately, the snake did not consume any eggs. After the snake left the nest, the grouse returned 2 hours later and resumed incubation. Ultimately, the female abandoned the nest approximately 7 hours after the initial encounter and no eggs hatched. The second gopher snake encounter occurred at 11:11 hours following the hatching of four chicks. The female sage-grouse was incubating the remaining single egg prior to the arrival of a snake of approximately 1 m in length (Figure 6A). During the interaction, the snake captured a chick (Figure 6B and C),

345 constricting the chick while fighting with the defending female grouse (Figure 6B and C). The
346 female struck and pecked at the snake numerous times. The snake made strikes directed at the
347 grouse and the snake did not retreat. Eventually, the female left the nest bowl with the remaining
348 three chicks (Figure 6D). The snake consumed the constricted chick (Figure 6D) in the nest bowl
349 then attempted to consume the unhatched egg. The remaining three chicks left the nest bowl area
350 with the female. The snake was unsuccessful in consuming the unhatched egg, seemingly due to
351 insufficient gape width.

352 **Video Recorded Rodents**

353 Many small rodents were documented visiting sage-grouse nests including California ground
354 squirrels (*Spermophilus beecheyi*), least chipmunks (*Tamias minimus*), Great Basin pocket mice
355 (*Perognathus parvus*), kangaroo rats (*Dipodomys* spp.), and other encounters with mice and
356 voles that could not be identified to species via videography. Rodents were recorded at nest
357 locations only while the female was absent from the nest during an incubation recess or after nest
358 termination. Most encounters involved a quick dash through the nest bowl. Occasionally small
359 rodents fed on broken eggshells that remained in nest bowls after depredation or hatch. On two
360 occasions, California ground squirrels visited nests following partial depredations where whole
361 eggs were left in the nest bowl. These ground squirrels were adept at manipulating sage-grouse
362 eggs (Figure 7A), but were unable to bite into whole eggs (Figure 7B and C), presumably due to
363 a limited gape width. On rare occasion, these ground squirrels appeared capable of removing
364 eggs from the nest bowl. One ground squirrel did access an egg after dropping the egg and
365 breaking the shell. We did not document any complete destruction of nest remains by a rodent
366 following a hatch or depredation that would have caused researchers to misclassify the fate of the
367 nest. In all cases of successful nests we were still able to find egg remains that clearly indicated a

368 successful hatch, even after rodents had visited the nest post hatch. However, for nests without
369 cameras we did not always know the precise number of hatched vs. depredated eggs if some of
370 the egg remains were crushed or destroyed. No rodents were documented flushing female sage-
371 grouse from sage-grouse nests.

372 **Discussion**

373 Depredation was the primary cause of sage-grouse nest failure and we observed avian,
374 mammalian, and reptilian predators taking eggs or chicks at the nest. Ravens were the most
375 frequent sage-grouse nest predator in the Virginia Mountains accounting for 46.7% of nest
376 depredations. Raven population size, density, and distribution have increased substantially across
377 the western U. S. as a result of habitat conversion and human activities that act to subsidize
378 ravens with food and nesting opportunities (Sauer et al. 2004; Kristan and Boarman 2007; Bui et
379 al. 2010; Howe 2012). For example, historically the sagebrush-steppe ecosystem likely had
380 relatively low raven population densities (Leu et al. 2008), but currently this ecosystem supports
381 higher numbers of ravens because of increased vertical perching and nesting substrates (e.g.,
382 electrical power line towers and other structures), as well as human-related food sources (e.g.,
383 road kill and refuse; Boarman 1993; Sauer et al. 2004). The increase in raven numbers within the
384 sagebrush-steppe is an important change because sage-grouse rely on visual concealment for
385 nesting while ravens rely on visual detection for hunting (Gregg et al. 1994; Conover et al.
386 2010). Ravens are common in the Virginia Mountains and our findings indicate that ravens
387 regularly are detecting and depredating sage-grouse nests.

388 The Virginia Mountains have been subject to disturbances from fire, agricultural
389 practices, and renewable energy exploration that have led to a reduction in extent and quality of
390 sagebrush habitat for nesting sage-grouse. The impacts of predators on prey populations may be

391 elevated when the quality and/or quantity of habitat are degraded (Hagen 2011). This habitat
392 degradation coupled with the presence of ravens may explain why ravens were the most frequent
393 sage-grouse nest predator and the low overall nest survival (22.4%) in this area. In Wyoming,
394 raven densities were highest near sage-grouse nesting areas and areas with human activity (Bui et
395 al. 2010). In northeastern Nevada, the probability of a sage-grouse nest being depredated by a
396 raven increased with less shrub canopy cover in the vicinity of the nest (Coates and Delehanty
397 2010). Furthermore, an increase in one raven per 10 km was associated with a 7.4% increase in
398 probability of nest failure (Coates and Delehanty 2010). In the Arco Desert of southeastern
399 Idaho, raven occurrence and raven nesting were strongly associated with the presence of artificial
400 structures such as power line towers (Howe 2012).
401 Ravens are not universally implicated as a major predator of sage-grouse nests. Some
402 studies using direct identification of nest predators have not found ravens to be a significant
403 factor (Holloran and Anderson 2003; Bell 2011). Differences in raven effects among sage-grouse
404 populations could be the result of geographic location, behavioral plasticity of ravens or sage-
405 grouse, prey abundance, habitat characteristics, or monitoring techniques. Further research is
406 needed to understand variation in sage-grouse nest depredation rates by ravens, but the variation
407 that has been documented helps to understand local dynamics when considering management
408 intervention.
409 Coyotes (20.0%) and badgers (13.3%) also were nest predators, occurring at frequencies
410 similar to other published reports (Holloran and Anderson 2003; Coates et al. 2008; Bell 2011).
411 Sage-grouse have been hypothesized to select nest sites with greater concealment from visual
412 predators (birds) and not from olfactory predators (mammals) though rates of nest depredation
413 by visual and olfactory predators were equal (Conover et al. 2010). Coyotes and badgers

414 consistently are identified as sage-grouse nest predators across studies, but at rates lower than
415 other nest predators which may not warrant management concern.

416 This study represents the first confirmed bobcat depredation of sage-grouse nests. Bobcat
417 depredations of sage-grouse nests likely occur at low frequencies although bobcats are known to
418 take sage-grouse chicks and adults (Nelson 1955; Hartzler 1974), and may leave diagnostic sign
419 at nest sites (Holloran et al. 2005). During our study, we documented one case of nest
420 depredation that also resulted in female mortality adjacent to the nest bowl. Conspicuous bobcat
421 tracks in the snow near the nest suggested that a bobcat killed the adult grouse and in this way
422 was indirectly associated with clutch loss.

423 Weasel interactions differed from interactions with other predatory mammals in that
424 incubating females actively defended their nests against weasel intrusion. One female was able to
425 resume incubation and the other female departed with at least one hatched chick after taking
426 initial defensive actions against the weasel. These results, coupled with aggression directed
427 towards weasels at the nest, indicate that female sage-grouse can actively defend nests against
428 some nest predators. There is little doubt that weasels are adept at taking young sage-grouse
429 chicks, but these may be opportunistic depredations considering weasels' primary prey consists
430 of voles and mice (DeVan 1982).

431 Although multiple rodent species were observed visiting sage-grouse nests, we did not
432 observe a rodent flush an incubating grouse nor did we observe a rodent capable of biting open
433 an intact sage-grouse egg. These results are consistent with previous findings from camera or
434 video recordings involving rodents at sage-grouse nests (Holloran and Anderson 2003; Coates et
435 al. 2008; Bell 2011). Rodents appeared to be unable to access intact sage-grouse eggs through
436 biting, probably limited by their gape width (Michener 2005). On this basis, rodent sign at sage-

grouse nests does not demonstrate that rodents caused nest failure, especially given the propensity of rodents to scavenge at previously depredated nests. California ground squirrels are relatively large with forelimb dexterity that allowed them to lift sage-grouse eggs, but even the California ground squirrels appeared to be unable to bite into intact eggs. Similar to rodents, gopher snakes were unsuccessful at consuming intact sage-grouse eggs seemingly because of inadequate gape width. Inability of snakes to consume sage-grouse eggs has been observed previously in two other sage-grouse populations within the Great Basin (Coates et al. 2008; Bell 2011).

We did not detect an effect of camera presence on DSR for sage-grouse nests in the Virginia Mountains. These results closely follow the results found by Coates et al. (2008) in northeastern Nevada using similar techniques. Cumulative nest survival was higher for monitored nests (video-monitored, 38.2%; and non-video monitored, 36.3%) considered in this analysis compared to cumulative nest survival for all nests (22.4%). But to be a monitored nest meant that the nest had to survive ≥ 3 days of incubation. Fifteen nests were located but did not survive to 3 days of incubation, the starting point for comparing video-monitored and non-video monitored nests.

In summary, we positively identified a suite of sage-grouse nest predators within a high elevation population of sage-grouse occupying the Virginia Mountains on the eastern flank of the Sierra Nevada by using continuous videography over a 3-year period. These results were the first to confirm bobcats and weasels as sage-grouse nest predators as previously suspected (Schroeder et al. 1999; Holloran and Anderson 2003; Hagen 2011; Kaczor et al. 2011). Rodent and snake species appear to be limited by gape width and evidence of these species as predators remains unsubstantiated. Besides unambiguous predator identification, we were able to determine the

460 relative frequency at which depredations by predator type occur within our study area, which
461 provide reasonable and valuable insight to which predator species are effective. Undoubtedly,
462 our estimates are subject to some degree of unintended bias, yet they provide a basis for future
463 comparisons as our understanding of sage-grouse nest failure grows. Unequivocal documentation
464 of the predator identity is especially useful given that the population under study experienced an
465 estimated cumulative nest survival rate of 22.4%, a rate lower than published maximum
466 likelihood estimates within the Great Basin (43%, Kolada et al. 2009; 36%, Rebholz et al. 2009;
467 42%, Coates and Delehanty 2010, respectively). Of the 40 nests that failed in our study, 33
468 (82.5%) were confirmed to have been caused by predators. Efforts to curb high rates of nest
469 depredation may be desirable, but one potentially effective practice of predator management
470 might be to restore and manage vegetation cover and reduce anthropogenic resource subsidies
471 (i.e., road kill and tall structures) that support predators like ravens. Further research that
472 identifies the circumstances in which depredation occurs will best guide these types of
473 management decisions.

474 **Supplemental Material**

475 **Table S1.** Data table containing the encounter history of sage-grouse nests in the Virginia
476 Mountains, NV from 2009 – 2011 that was analyzed with the RMark package (R Version 2.13,
477 www.r-project.org) that implements Program MARK for estimating daily survival rate (DSR)
478 and cumulative survival rate (CSR) for nests. nest = unique nest identification number,
479 FirstFound = day nest was first detected, LastPresent = last day the nest was known to be
480 present, LastChecked = last day the nest was checked, Fate = the fate of the nest (0 means nest
481 was successful; 1 means nest was unsuccessful), Freq = the number of nests that had this history,
482 yr = the calendar year that the nest existed, camera = whether a nest was monitored with a

camera or not (0 means a camera was present; 1 means no camera was present), n1 = whether a nest was a first nest attempt or a second nest attempt (0 means the nest was a first attempt; 1 means the nest was a re-nest attempt). Individual covariates for year, presence of a camera, and nest attempt were included in addition to encounter history to test for effects of these factors on DSR and CSR for sage-grouse nests.

Found a DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S1 (15 KB XLSX)

Video S1. <badger caption>

Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S2

Video S2. <bobcat caption>

Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S3

Video S3. <raven caption>

Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S4

Video S4. <snake caption>

Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S5

Video S5. <squirrel caption>

Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S6

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515

516 **Acknowledgments**

517 This research was part of a cooperative effort with U.S. Geological Survey, Nevada Department
518 of Wildlife (NDOW), Idaho State University (ISU), and the U.S. Fish & Wildlife Service. We
519 thank C. Hampson with NDOW for his expertise, logistical support, and assistance with data
520 collection efforts. We thank T. Kimball, P. Gore, M. Meshiry, J. Sweeney, and V. Johnson for
521 their time spent entering data, performing analyses, assistance producing reports, and logistics.
522 Winnemucca Ranch, Big Canyon Ranch, and Fish Springs Ranch provided access onto their
523 private land as well as housing for field crews. We are extremely grateful to J. Dudko, S.
524 Lockwood, K. Buckles, and N. Kelly for their diligence collecting data in the field. Comments
525 from the Subject Editor and anonymous reviewers greatly enhanced the quality of this
526 manuscript.
527 Any use of trade, product, or firm names is for descriptive purposes only and does not imply
528 endorsement by the U.S. Government.
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642

643 **Table Legend**

644

645 Table 1. Evidence of generalized linear models (binomial distribution) to evaluate factors that
646 influence nest survival of greater sage-grouse (*Centrocercus urophasianus*). Data were collected
647 in the Virginia Mountains, NV during 2009 – 2011. K = number of estimated parameters, -2 LL
648 = Log (*Likelihood*), ΔAIC*c* = difference (Δ) in Akaike's information criterion with sample size
649 adjustment (*c*) between model of interest and most parsimonious model. Step I evaluated
650 evidence for differences between years. A model with year as a factor was carried forward to
651 Step II and III as the base model. Step II compared the additive effect of nest attempt and year to
652 the base model. Because no difference (ΔAIC < 2) was found between first and second nests,
653 data were pooled for Step III. Step III evaluated the additive effect of camera and year to the
654 base model. In Step III we excluded non-video monitored nests (n = 15) from the analysis that
655 did not meet the same criteria for camera installation (≥ 3 days of incubation).

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Figure Legend

Figure 1. Map of study area location, Virginia Mountains, located in northwestern Nevada, USA.

Figure 2. Sequence of still photographs from video recordings of a raven (*Corvus corax*) attacking an incubating female sage-grouse (*Centrocercus urophasianus*) and then depredating the eggs within an 8-second period in the Virginia Mountains, Nevada, 2010. Still images depict a female incubating prior to being struck by a raven (A), harassment of the sage-grouse by the raven (B), and raven removing eggs (C and D).

Figure 3. Still images from video recordings at sage-grouse (*Centrocercus urophasianus*) nests in the Virginia Mountains, Nevada from 2009 – 2011 of complete nest depredations. Still images depict coyote (*Canis latrans*; A), American badger (*Taxidea taxus*; B), and bobcat (*Lynx rufus*; C).

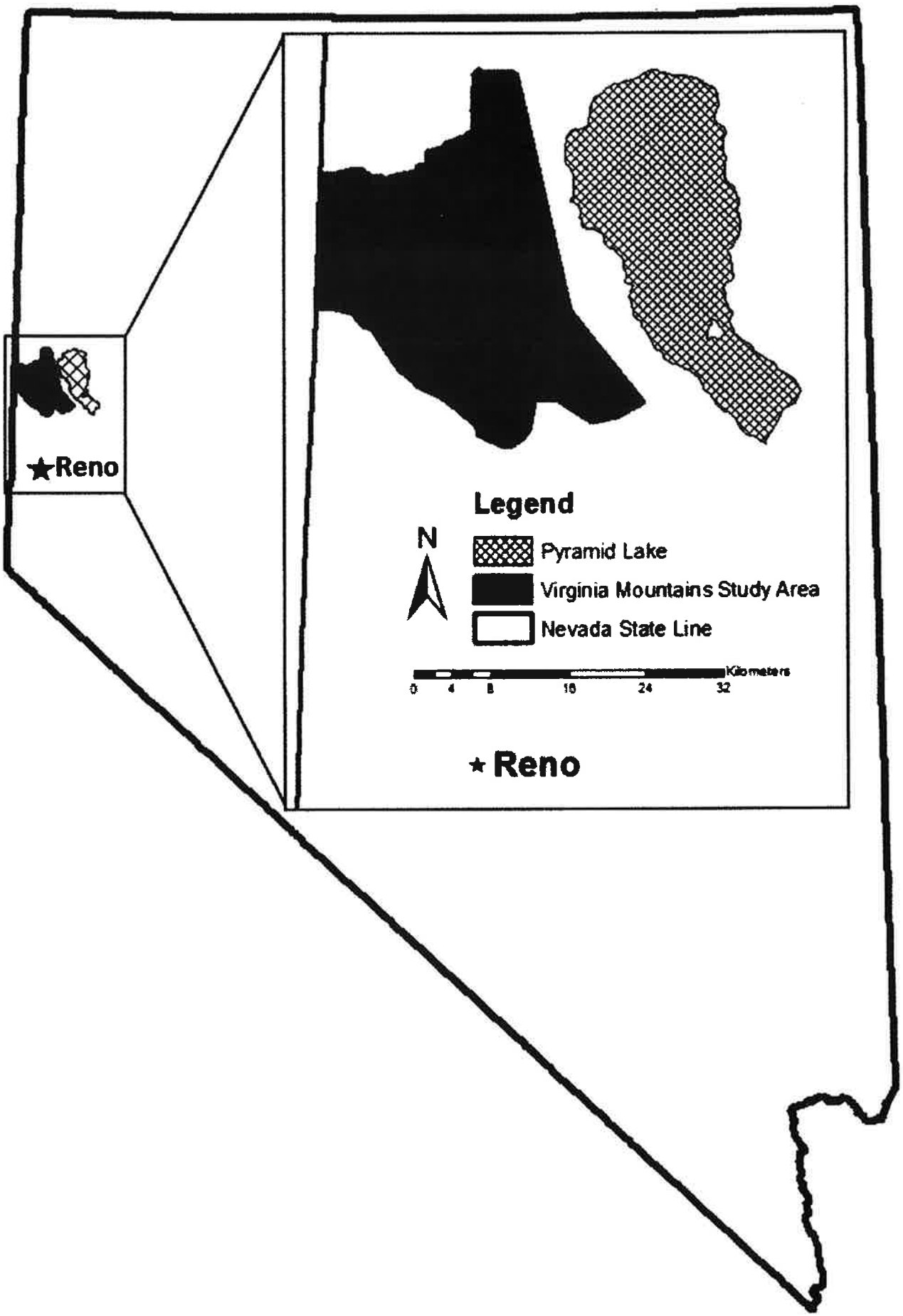
Figure 4. Sequence of still photographs from video recordings of a long-tailed weasel (*Mustela frenata*) entering the nest of an incubating female sage-grouse (*Centrocercus urophasianus*) in the Virginia Mountains, Nevada, 2011. Still images depict the nose of weasel as it first enters camera view (A), weasel approaching female's head (B), and weasel harassing female prior to grouse initiating nest defense (C).

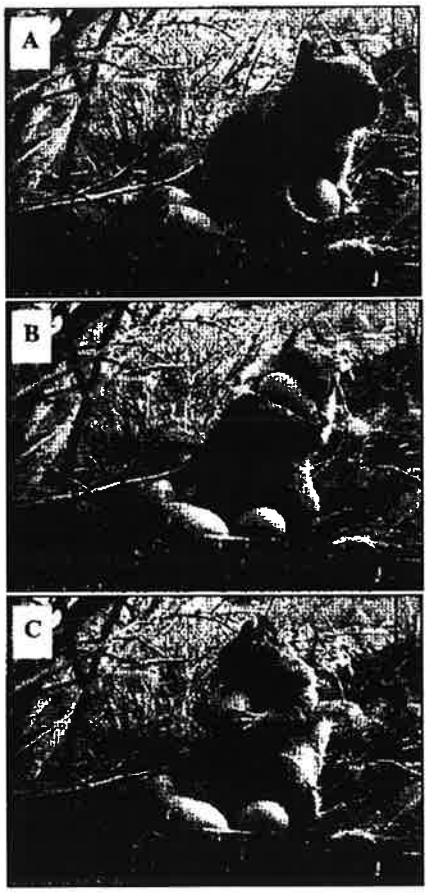
688 Figure 5. Still images from video recordings at a sage-grouse (*Centrocercus urophasianus*) nest
689 in the Virginia Mountains, Nevada in 2009 of a Great Basin gopher snake (*Pituophis catenifer*
690 *deserticola)* in a sage-grouse nest. Images depict snake placing its mouth on a sage-grouse egg
691 (A), the snake attempting, but failing, to consume sage-grouse eggs (B and C).
692
693 Figure 6. Sequence of still photographs from video recordings of a Great Basin gopher snake
694 (*Pituophis catenifer deserticola)* entering a sage-grouse (*Centrocercus urophasianus*) nest
695 during hatch in the Virginia Mountains, Nevada, 2010. Still images depict a sage-grouse
696 incubating moments before a snake enters the nest (A), a sage-grouse standing over the snake
697 that has captured and is constricting a sage-grouse chick (B and C). Following the adult grouse's
698 departure from the nest, an unharmed chick flees the nest area (D), and the snake beginning to
699 consume the sage-grouse chick after constricting the chick (D).
700
701 Figure 7. Sequence of still images from video recordings of a California ground squirrel
702 (*Spermophilus beecheyi*) at a sage-grouse (*Centrocercus urophasianus*) nest in the Virginia
703 Mountains, Nevada, 2010. Images depict ground squirrel manipulating eggs (A and B) and
704 attempting, unsuccessfully, to bite the egg (C).
705

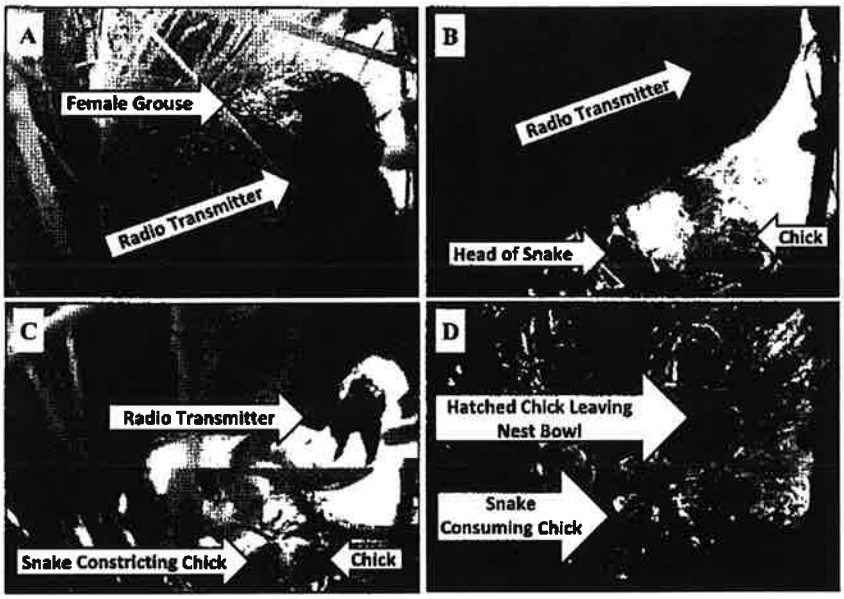
Table 1. Evidence of generalized linear models (binomial distribution) to evaluate factors that influence nest survival of greater sage-grouse. Data were collected in the Virginia Mountains, NV during 2009 – 2011. K = number of estimated parameters, -2 LL = Log (*Likelihood*), ΔAIC*c* = difference (Δ) in Akaike's information criterion with sample size adjustment (*c*) between model of interest and most parsimonious model.

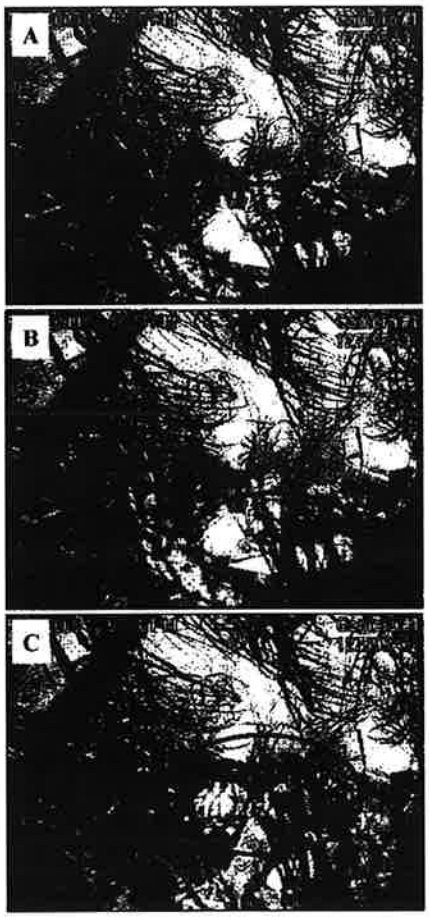
Step[a]	Model	K	-2 LL	ΔAIC*c*	*w*
I	Year	3	231.6	0.00	0.93
	Intercept-only	1	240.8	5.19	0.07
II	Nest Attempt + Year	4	227.6	0.00	0.72
	Base $_{(Year)}$	3	231.6	1.90	0.28
III	Base $_{(Year)}$	3	173.4	0.00	0.71
	Camera + Year	4	173.2	1.79	0.29

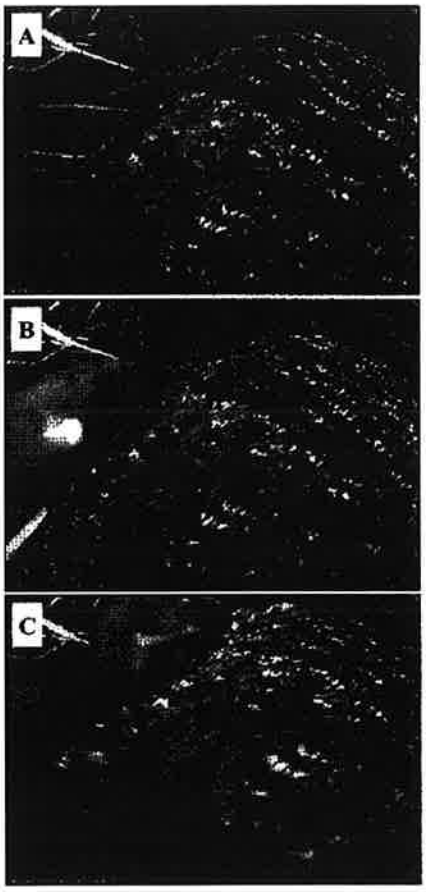
[a] Step I evaluated evidence for differences between years. A model with year as a factor was carried forward to Step II and III as the base model. Step II compared the additive effect of nest attempt and year to the base model. Because no difference (ΔAIC < 2) was found between first and second nests, data were pooled for Step III. Step III evaluated the additive effect of camera and year to the base model. In Step III we excluded non-video monitored nests (n = 15) from the analysis that did not meet the same criteria for camera installation (≥ 3 days of incubation).

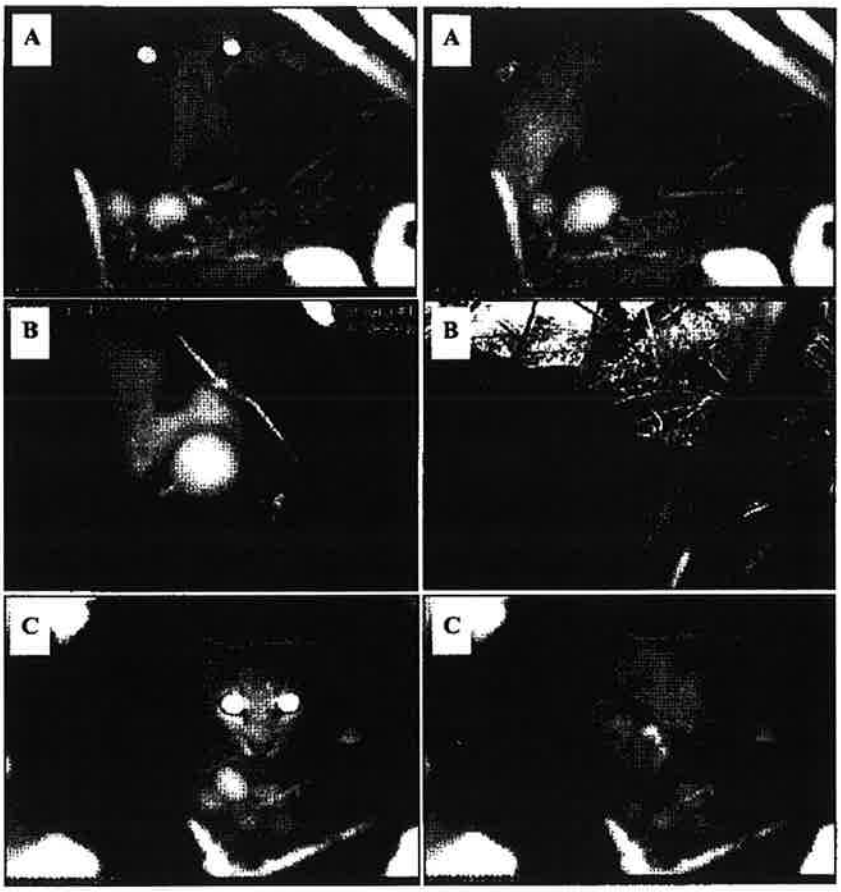

★Reno
Legend
N
Pyramid Lake
Virginia Mountains Study Area
Nevada State Line
Kilometers
0 4 8 16 24 32
★Reno

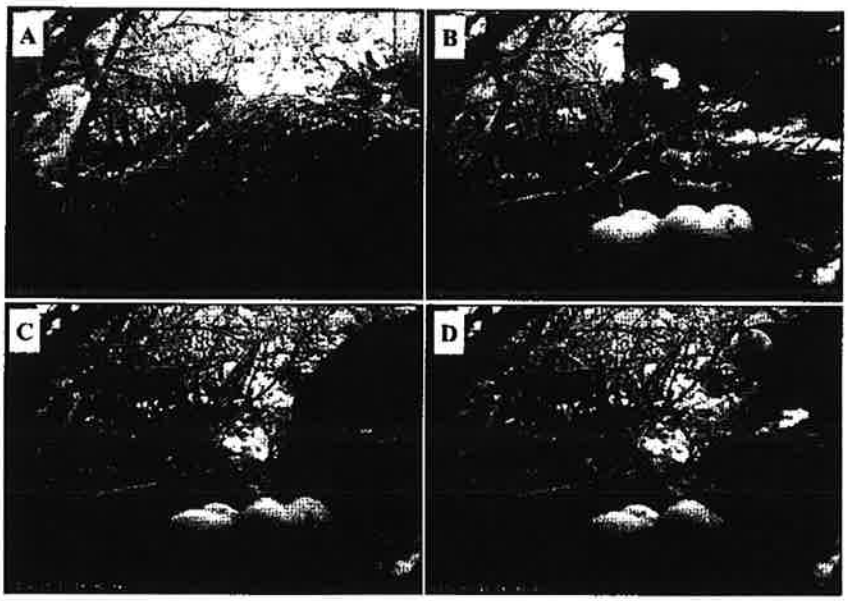

A
B
C


A
Female Grouse
Radio Transmitter
B
Radio Transmitter
Head of Snake
Chick
C
Radio Transmitter
Snake Constricting Chick
Chick
D
Hatched Chick Leaving Nest Bowl
Snake Consuming Chick


A
B
C


A
B
C


A
A
B
B
C
C


A
B
C
D